

FLIGHT

and
AIRCRAFT
ENGINEER

First Aero Weekly in the World.

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EDITORIAL COMMENT.

PRECISELY to what extent flying will be permitted and under what regulations we do not know at the present, but the announcement by the Air Ministry that on and after May 1 the principal restrictions on private flying will be removed is certainly something to the good. In another direction, too, the Air Ministry has shown itself progressive and anxious to help along the cause of commercial aviation. We refer particularly to the permission recently given to carry out aerial passenger services at the holiday resorts during the Easter holiday. Naturally, the permission accorded was taken full advantage of by many firms and individuals associated with the movement, and at the time of writing we have no reason to think otherwise than that the best interests of flight have been well advanced by the numerous services carried out, which have all served to drive home to the public mind that flying has really arrived as a concrete

Removing the Ban on Aviation

commercial proposition. It is somewhat to be regretted, however, that the Air Ministry could not have made its announcement a little earlier. The short notice given—a few days only—might easily have tempted ambitious firms and individuals to take risks they were not justified in incurring, through want of proper preparation, in order to be well to the fore with their programmes of aerial "joy-rides." However, we do not desire to be too critical of action that must, on general principles, commend itself to everyone interested in the development of the movement, particularly as "All's well that ends well."

The Royal Aeronautical Society

The 34th annual report of the Royal Aeronautical Society, which lies before us, is one upon which we feel we can sincerely congratulate the Society and the Council. It is a record of true progress all along the line. Before we go any farther, we would congratulate the Society on the honour accorded nearly a year ago by the King, who was graciously pleased to grant to it the privilege of using the prefix "Royal" to its title. This, we may remark, was not at all an empty honour, but was conferred in recognition of the really excellent work performed by the Society on behalf of the cause of aviation.

The report discloses that in January of last year the membership of the Society stood at 690, a considerable advance on the numbers of a year before, but in January of this year the figure had increased to 1,045. A good deal of progress has been made with the organisation of branches of the Society. That in Manchester is organised and has already held a number of successful meetings. In connection with this branch the College of Technology (Manchester University) has arranged a course of lectures on aeronautics which have been very well attended. It is clear that here is at least one very live provincial branch of the Society. The Hendon branch, again, has a large membership and is now completing its final arrangements.

Regarding the technical side of the Society's work, it is remarked by the report that the Technical Terms Committee has completed the present stage of its work, and has issued a glossary of terms which is described as a working compromise which will be revised and improved as opportunity offers. Embodied in the glossary is a system of notation for use

in aerodynamical calculations. This is an essentially useful piece of work, in that it will help to co-ordinate the work of designers and others by preventing the possibility of error through confusion of terms. The activities of the Society during the year reviewed by the report are too many and wide in their scope to be referred to at length in an article such as this, covering every phase of work from the preparation of notation systems to the problems created by the demobilisation of flying officers, so we must content ourselves with once more congratulating the Society on the excellent record set forth in the report, and wishing it even greater success in the future.

The Impasse of the R.A.F.

It still appears impossible for the Air Ministry to make up its mind about the terms of engagement it is prepared to offer to officers who are willing to take up permanent commissions in the R.A.F. Instruction after instruction seems to be issued to the officers concerned, each one, if possible, more vague than the last. In fact, not many days ago, if our information is correct, a circular letter was issued asking officers to signify their willingness to accept permanent commissions without knowing upon what terms—inviting them, in a word, to commit themselves to an engagement upon any terms the Air Ministry might think fit subsequently to lay down. Needless to say, the response was utterly lacking in enthusiasm, to put it quite mildly, and the letter in question was shortly followed by another a little less indefinite in terms. But even yet no-one knows exactly what it is he is being asked to do. Officers who have attained to senior ranks in the Service do not know whether they are to expect to retain the rank and seniority they have obtained by meritorious work in the War, or if they are to be asked to step down two or three grades. We agree that it is impossible that everyone who desires to remain should stay on in the rank he holds now. That is quite out of the question, and it were better that officers concerned should realise it at once, but the point at issue, so it seems to us, is that they are not being told what is to happen to them and they are thus unable to make up their minds whether to stay on or to apply for immediate demobilisation. The quite natural result of it all is that the best of the *personnel* is seeking civilian employment, where the terms of engagement are less indefinite, and the R.A.F. is thus in danger of losing the very men who should be retained. Unless matters are made clearer before very long, the R.A.F. will find it has lost all the good men and has nothing but the "duds" left.

Another source of discontent with which the Air Ministry will do well to reckon is the continuous replacement of officers who have served in the War by civilians who have done nothing but remain at home in safety. We are aware that the reason for this is partly that it has not yet been settled on what terms of pay and pension officers transferring to the Department of Civilian Aviation are to be engaged. That, however, is part of the perfectly legitimate grievance to which we have already referred and seems to be a natural result of the procrastination which has attended the whole matter of service in the R.A.F. Surely, now that nearly six months have passed since the Armistice was signed, it is time some concrete decision had been arrived at by the Ministry. There may be good reasons for the delay, but if there are they are certainly not apparent to the mere outside

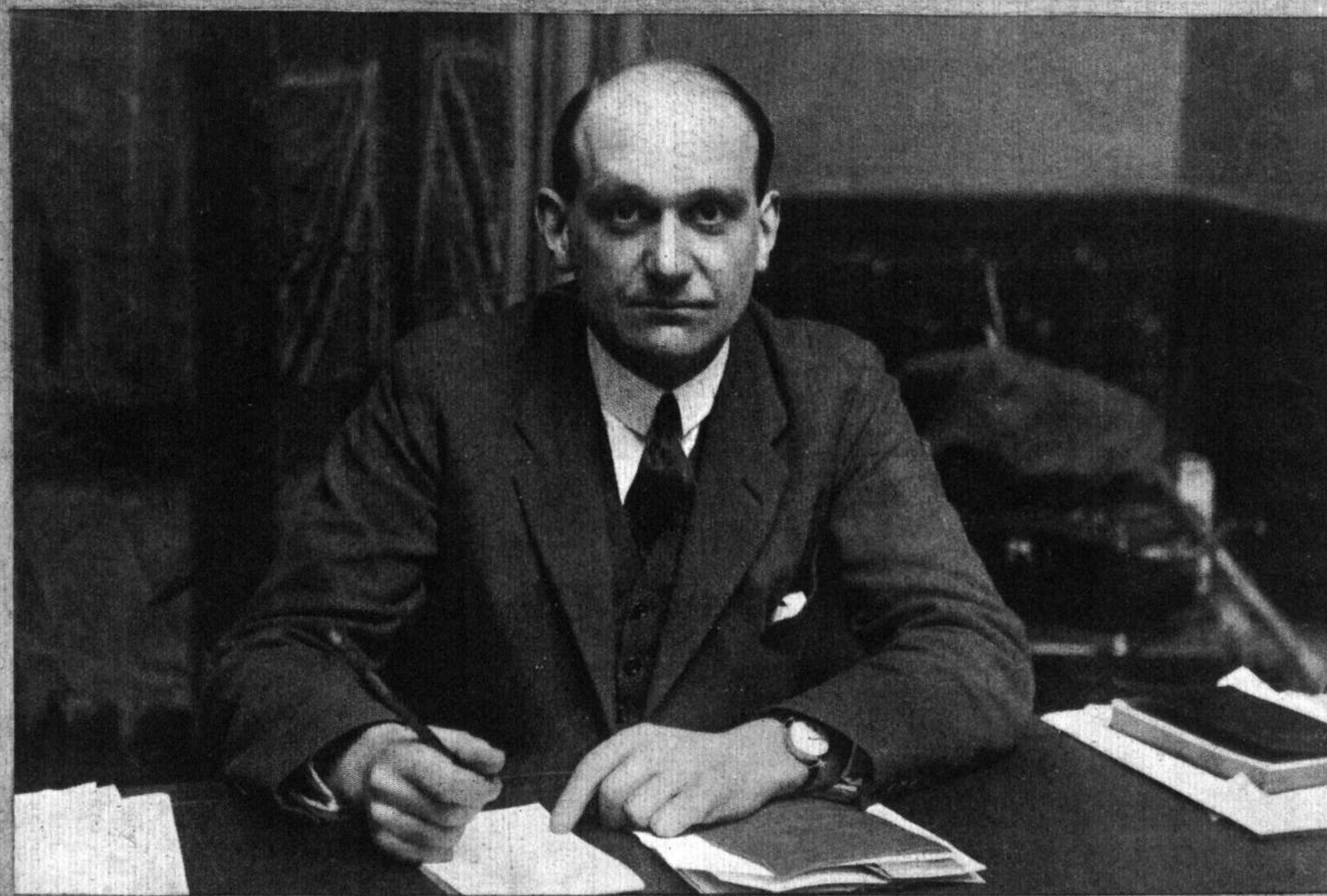
observer. If those reasons exist, they should be stated for the information of those they mostly concern. The present position is anomalous and is causing the gravest discontent among the officers who are affected, many of whom are desirous of continuing to serve the country but are held in a state of continual uncertainty until most of the really efficient are made sick of the whole thing and apply for demobilisation. If it were not that we know the ideas of the men who have been responsible for the administration of the R.A.F. during the War, we should be inclined to think that there was a deliberate policy of "freeze out" in operation. As it is, we can only assume that it is the Treasury which stands in the way of a definite pronouncement. It would be well if the matter were raised in the House on the Estimates, and a categorical explanation demanded from the Air Minister. One thing is certain, that the present position is operating most detrimentally to the best interests of the R.A.F.

Aeroplane Services in Germany

There is not the slightest doubt that Germany has learnt well the lesson of what aerial navigation is destined to achieve in the future. According to the most reliable news from that country there are at the present moment no fewer than six separate long distance aeroplane services in operation, successfully engaged on the carriage of passengers and mails. In this direction Germany has certainly got the rest of the world at a temporary disadvantage, but it must be remembered in justice to our own authorities that she is not hampered in the way the rest of the Allied nations are by the necessity of first agreeing to a set of international rules and regulations for aerial navigation. In Germany the conditions are possibly more favourable for internal aerial services than in any other country in Europe. Distances are greater and frontiers therefore more remote, while the contours are more favourable than elsewhere. In our own case, it is generally conceded that the future of internal services is but a small part of the development to be looked to in the future. It is to overseas flight and to international communication that we have to look for our own future, and it is perfectly obvious that we cannot embark upon the real process of development until the necessary laws and regulations have been drafted and agreed. The first part of this latter programme has been completed and it is now only a matter of a very short while—it may be days—before the draft regulations have been approved by the Peace Conference, and we shall be able to go right ahead with our programmes of development. It will not do, however, to ignore the possibility that Germany will make a determined bid for the dominion of the air, perhaps not the military dominion but certainly the commercial. We cannot fall into a graver error than to imagine that Germany has been reduced to a *quantité negligible* in the way of commercial competition. Apart altogether from the enormous costs of the War to herself and the indemnities she is to be called upon to pay, Germany is a country of vast resources and of limitless energy. Given that she should escape falling into Bolshevism, we shall find her a very formidable competitor not only in the air but in commerce generally. It is all very well to solace ourselves with the belief that it will be a generation before her crimes are so far forgotten that the civilised nations will consent to take her hand again and restore her to her former position as a

Flight—And the Men

APRIL 24, 1919



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world supplier. Memories are short and where any advantage of price or terms enters into the calculation we may be very sure that before long Germany will find little difficulty in securing a share of the world's markets. If anyone doubts that, he need only remember that one of the first customers Germany regained after the Armistice was the British War Office. The incident of the demobilisation papers printed in Cologne is too recent to have been forgotten. Therefore, let us keep an eye on German competition all along the line, lest we should meet with a rude awakening one of these days.

"The War in the Air"

To all, whether directly interested in flying or not, we have no hesitation in again recommending a visit to the Grafton Galleries, where the really marvellous series of photographs, officially taken by the R.A.F. on the various fronts and in other places is being exhibited. A more eloquent lesson in the possibilities of aircraft it would be impossible to imagine. For the most part, the pictures simply defy description. Indeed, even if it were possible to describe them we should not in fairness to the exhibition attempt to do so, but like many another thing of the kind no language can do justice to them—they must be seen to be believed. It is an exhibition that literally no-one should miss—nothing

like it has ever been seen before, nor will again so far as war pictures are concerned.

Sir Douglas Haig on the Aerial War

In his closing despatch on the conduct of the War in the West, Sir Douglas Haig pays a striking tribute to the work of the R.A.F. In our last issue we published extracts from the despatch dealing with this aspect of the fighting, which are more eloquent for what they refrain from saying than descriptive of the actual work of our aerial fighting men. He remarks that "the great development of air photography . . . brought counter-battery work and harassing fire both by day and by night to a high state of perfection. Special progress was made in the art of engaging moving targets with fire controlled by observation from aeroplanes and balloons." It would appear from this that the standard of aerial observation had indeed progressed farther than was believed by most, wonderful as we knew the exploits of our aerial observers to be.

The Commander-in-Chief's tribute to Gen. Trenchard is one which must give the most intense satisfaction to that brilliant officer and will be remembered by him in after years with legitimate pride in the achievements of the Force he did so much to create and commanded with such distinguished ability in the field.

THE PEACE CONFERENCE AND AIR RULES

THE following official *communiqué* was issued in Paris on April 18 :—

The seventh and eighth meetings of the Aeronautical Commission of the Peace Conference were held on April 15 and 16. The British delegates were Maj.-Genl. Sir F. H. Sykes and the Marquess of Londonderry.

The Commission had before them full reports from their commercial, legal, financial, and technical sub-committees, to which were attached the 41 articles of the draft convention and its six annexes. On the question of the nationality of aircraft the analogy of merchant shipping has been followed to a certain extent, and the main principle is that this nationality should be governed by the nationality of the owner of the aircraft.

The Commission has decided as a matter of principle that certificates of airworthiness in the case of the aircraft and certificates of competency in the case of the crew are to be recognised as universally necessary in international flying.

The right of flying over a State from frontier to frontier is recognised, subject to the safeguard that the State flown over may compel a landing in the interests of national

security, or, in other words, where reasonable suspicion exists that the flight is not *bona fide*. In the interests of domestic control by each State there are provisions as to the carriage of various papers of identity, etc., upon the aircraft, and the prohibition of the carriage of dangerous articles is also provided for.

The final provisions include an arbitration clause for the settlement of disputes and a clause which definitely places the convention on a peace basis as not affecting the rights and duties of belligerents or neutrals. Military aircraft are placed in a class apart, and may not fly outside their own country, except by the special authorisation of a State visited by them, in which case they are to be treated according to the usual rules prevailing in the case of ships of war.

The Convention contemplates the formation of a permanent international Commission, which will keep in close touch with all new developments and act as a clearing house for information on questions of air navigation between the respective States.

The Commission directed that a complete draft dealing with the various amendments proposed should be prepared for their next meeting.

The New R.A.F. Flag

THE new flag, which will probably be adopted by the R.A.F., was seen in use for the first time on April 18, when it was flown by an airship of the S.S. twin type which cruised to Windsor in order that it might be displayed before H.M. the King, General-in-Chief of the R.A.F. The new flag, which has received the approval of the Air Council, is on similar lines to the White Ensign, but with a blue cross in place of the red St. George's Cross and with the crown and bird badge of the R.A.F. in the centre. Among those on board the airship was Maj.-Gen. J. E. B. Seely, Under-Secretary for Air, and the vessel cruised over London on its return from Windsor.

Aircraft Distress Signals

THE Air Ministry makes the following announcement : In order to eliminate unnecessary risks of fatal accidents to aircraft and pilot, signals for aircraft in distress have been provisionally agreed upon by the International Aerial Sub-

Committee of the Peace Conference at Paris, and will be used in the future. The signals, which may be displayed by the aircraft either together or separately, are as follows :

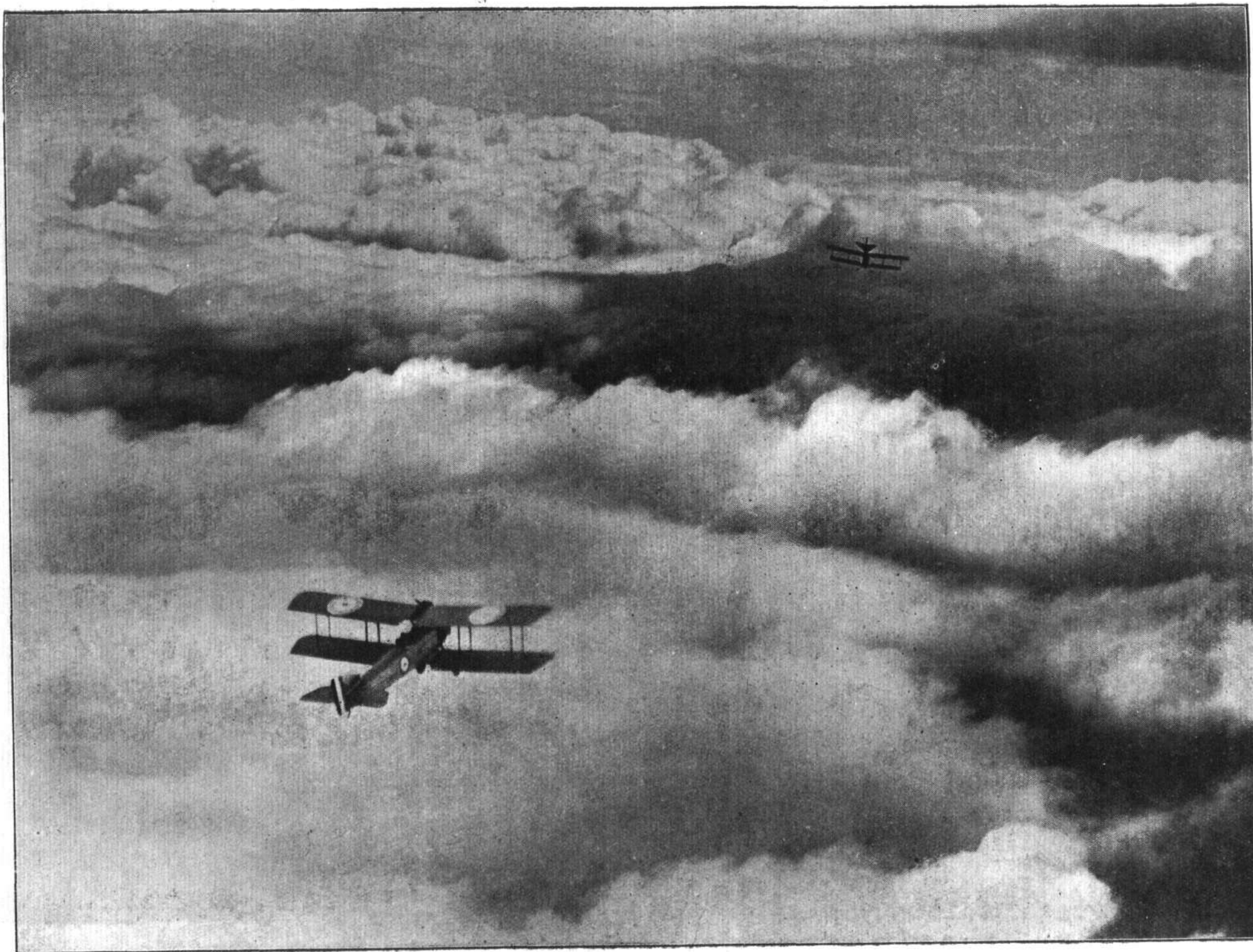
1. The international signal "S.O.S." by means of visual or wireless telegraphy.
2. The international code signal of distress indicated by N.C.
3. The distance signal, consisting of a square flag having above or below it a ball or anything resembling a ball.
4. The continuous sounding with any sound apparatus.
5. A signal consisting of a succession of white Very lights fired at short intervals.

These signals are subject to such modifications as may be published from time to time.

The Admiralty has issued a "Notice to Mariners" containing this information, and the Board of Trade is also notifying owners and masters of shipping. The Air Ministry has called the attention of all service pilots to the new signals in the official weekly orders.

APRIL 24, 1919

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SUNDAY
APRIL 24, 1919



At the R.A.F. "War in the Air" Exhibition at the Grafton Galleries:—"Wind Up!"—A British fighting machine chasing a Hun

THE PFALZ (D XII) SINGLE-SEATER FIGHTER

[Issued by Technical Department (Aircraft Production), Ministry of Munitions]

THIS aeroplane, which is allotted G/H.Q./6, was brought down near Dury, on 15/9/18, by Lieut. Cameron (No. 1 Squadron) and Capt. Staton (No. 62 Squadron).

Although in construction it is strongly reminiscent of the Nieuport-like type of Pfalz, the design of this machine is entirely new, and is of considerable interest.

General Design

As will be seen from the general arrangement drawings the D XII Pfalz has a car-type radiator in front of the engine, and wings which have two bays a side. The lower planes are faired off into the body in the characteristic Pfalz way, but the fin, which in the earlier model was built of 3-ply as an integral part of the body, is now a separate fitting.

Area of upper wings (without ailerons)	104.8 sq. ft.
Area of lower wings (both)	117.6 sq. ft.
Area of aileron (one only)	8.4 sq. ft.
Area of balance of aileron	.8 sq. ft.
Area of elevators (each)	8.4 sq. ft.
Area of balance of elevator (one)	.6 sq. ft.
Area of rudder	8.8 sq. ft.
Area of balance of rudder	.4 sq. ft.
Area of tail plane (both sides)	16.0 sq. ft.
Area of fin	4.4 sq. ft.
Area of body (horizontal)	32.8 sq. ft.
Area of body (vertical)	53.6 sq. ft.
Engine	180 h.p. Mercedes
Petrol capacity	18½ gallons.
Guns	Two Spandau (fixed).

The portion of body 3-ply which bears an inscription regarding weight and permissible load is missing.

Wings

The flat upper plane is built in one piece as before, but the centre section contains neither gravity tank nor radiator, and the tips are no longer heavily raked. The two ailerons of high aspect ratio, are very similar to those of the D VII Fokker, as are the placing of the radiator and the form of the interplane struts.

The lower planes, which are attached to a kind of centre section that may be said to grow out of the body, are of the same chord as the upper plane, and only slightly shorter in span. The lower planes possess a dihedral angle, in this case of 1½°, and the two pairs of interplane struts on each side slope outwards.

The attachments of the lower plane to the body are unchanged. From Fig. 1 it will be seen that the spars are cut down to circular section at their extremities, and a piece of steel tube is bolted over.

A lug on the fuselage has a circular-section base round which the open end of the tube on the spar fits, while the lug itself is pinned into the fork on the spar in the usual manner. Both front and rear spars are attached in this way.

Fig. 2 shows the upper aerofoil section compared with that of the R.A.F. 14, which is shown dotted. It will be noticed that the two sections approximate more closely than was previously the case.

The wing construction of upper and lower planes is similar. Each lower wing contains eleven ribs, spaced at equal intervals of approximately 13½ in. The wood leading edge of the

plane is not of the usual "C" section, but is more solid, as will be noticed from Fig. 3. The spars retain the former Pfalz design, but the section is of a squarer shape than formerly, and the flanges are not spindled. Dimensioned sketches are given in Fig. 4, and the upper and lower plane spars are exactly similar. At those points where the strut attachments occur, the spars are solidified by the insertion of small blocks of wood, as shown in the lower sketch of Fig. 4. The various components of the spars are very strongly glued together with a casein cement, and fabric is glued round the whole.

The tape lattice work that was found in the old-type Pfalz between the spars, and between the rear spar and trailing edge is no longer present, but a vertical rectangular-section strip of wood lies parallel to the rear spar between that member and the trailing edge, and strips of wood are tacked on to the leading edge, and on to the two spars, and finish just behind this strip. These false ribs are placed midway between the true ribs, and the space between each false and true rib is again bisected by another strip. These pieces simply pass from the leading edge to just behind the front spar, and are built up with a vertical strip so that the whole is of T section. The ribs are of 2 mm. 3-ply, with flanges tacked on in the usual way, and are lightened to the extent shown in Fig. 3, which explains clearly all the features just described. The trailing edge is of wire, and each rib has fabric sewn over it. There are twelve steel compression tubes in the upper plane, and five in each of the lower planes. The bracing varies from steel tie rods of 5 mm. diameter to 12-gauge piano wire.

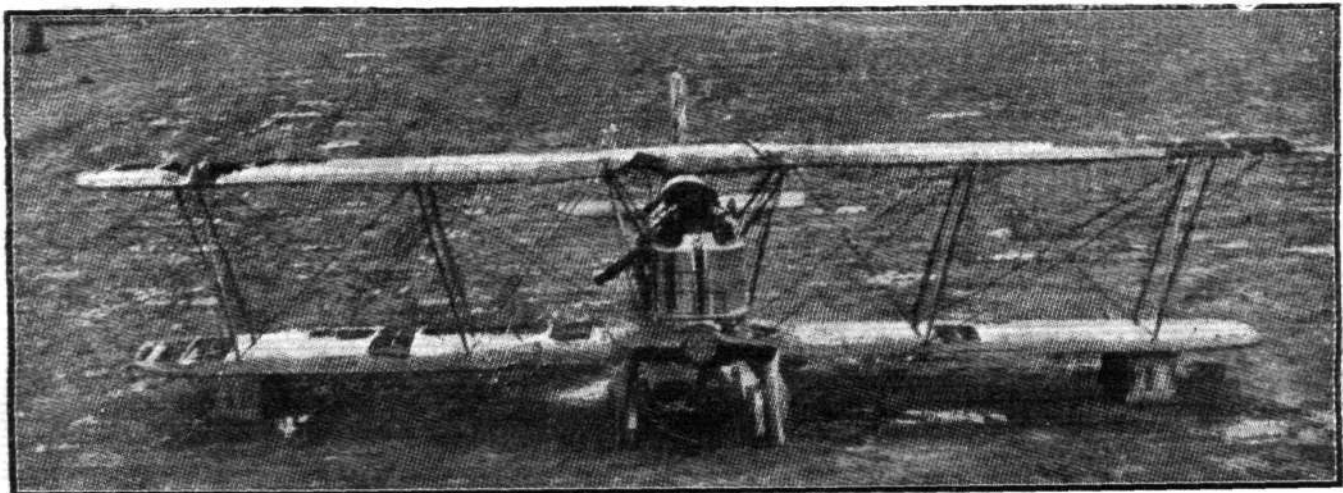
Ailerons

The ailerons, which are fitted only to the upper wings, are very similar to those of the D VII Fokker. They are balanced, and their high aspect ratio can be judged from the general arrangement drawings. They are constructed of light welded steel tube, and have the usual welded-up curved aileron lever, which works in a slot cut in the plane. The hinges by which the ailerons are attached are very simple. A length of ½-in. mild steel rod passes through eyebolts fixed alternately to the wing and aileron, and is secured at one end by a knob, and at the other end by a split pin. Fig. 5 shows how strongly the false spar, to which the aileron is hinged, is coupled to the rear spar.

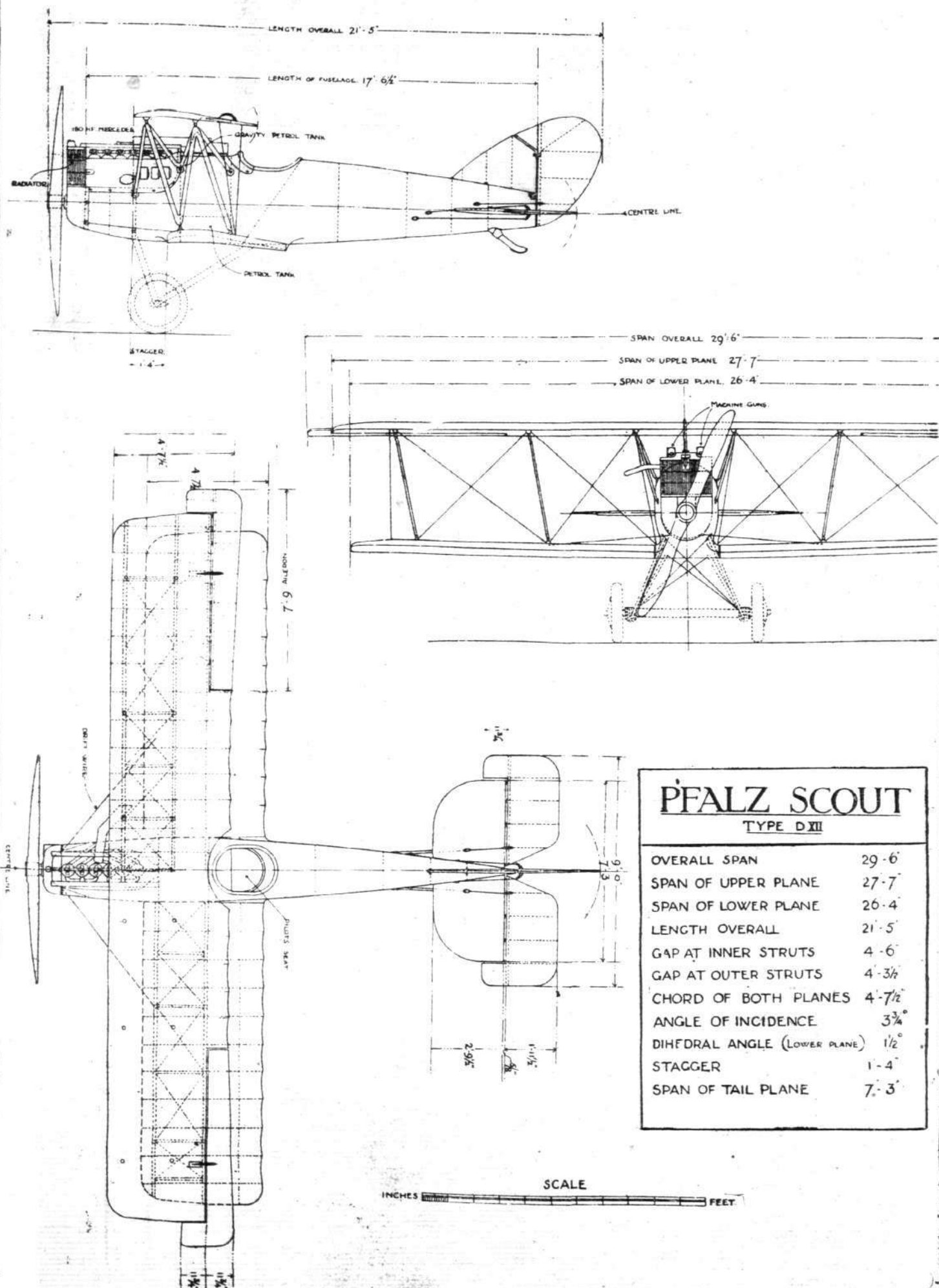
Struts

All the interplane struts of the D XII are of streamline steel tube, and not of wood as before. The centre section struts take the form of two "M's," as is clearly shown by the side view in the scale drawings. A slight adjustment is possible at the three central points, by the means already mentioned in the report on the Fokker biplane, i.e., there is a nut welded to the point of the strut, and a ball-headed bolt is screwed in. The ball, which is drilled, fits into a pierced round socket, and a small bolt locks the joint.

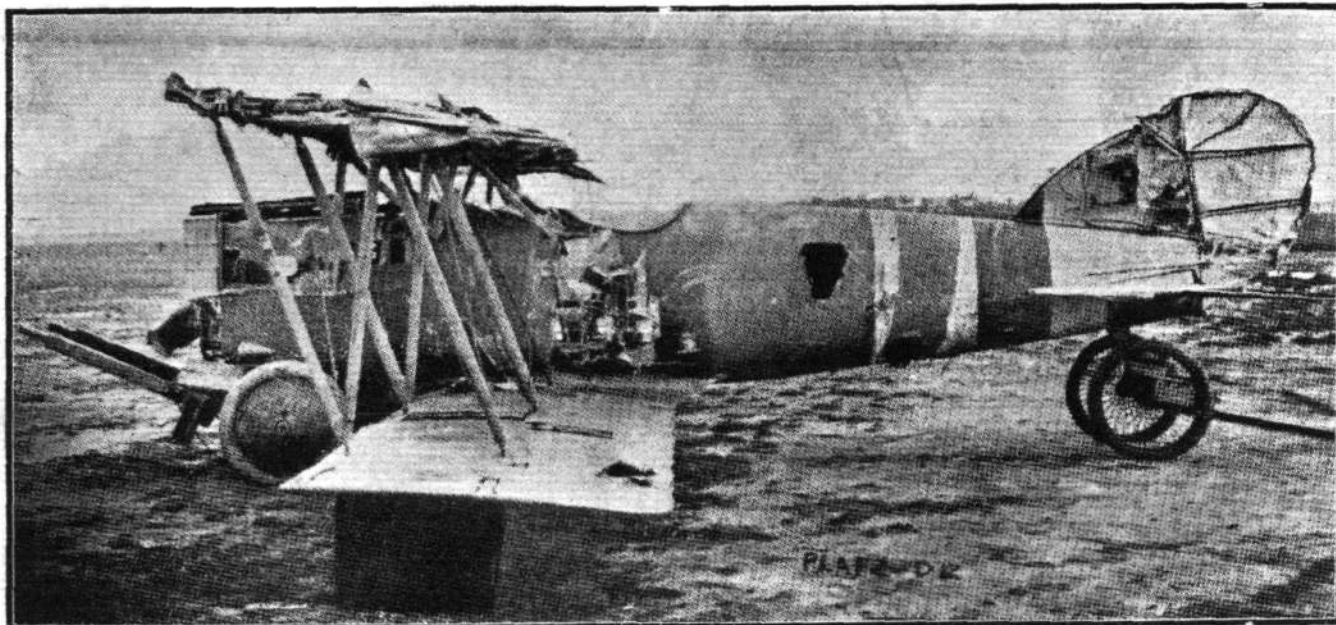
The interplane struts are of precisely similar design to those of the D VII Fokker, and are of N-shape when seen from the starboard side of the machine. They slope outwards from bottom to top, but, since the spars are equal distances apart in top and bottom planes, the front and rear limbs are parallel. They are attached to the spars by similar joints to those of the centre section, but in this case the strut



Front view of D XII Pfalz. Note radiator and sloping 'N' struts



General arrangement drawings of Pfalz Scout D XII



The port side of the D XII Pfalz

carries the cup, and the spar has the ball-headed bolt passing through from top to bottom. Fig. 6 shows the spar fitting, and explains the manner in which the bracing is fixed by a dome held down by the bolt. The diameter and width of the struts, both centre section and interplane, are marked on a diagram, Fig. 7. The gauge of the metal has not been measured.

The wings are braced with the usual flying and landing cables, and besides these it will be noticed from the scale drawings, that a lift wire is fitted between the lower rear spar and fuselage joint at the lower end, and the upper rear spar and centre section strut at the upper end. The lower front spar root is also joined by a cable to a lug fixed a few inches from the front of the engine bearers.

Fuselage

It is interesting to note that, although many drastic alterations between the D III Pfalz and the new type have been made, the method of construction employed for the fuselage has not been changed.

The body is of oval section, deeper in proportion to its width than before, and has eight lightened longerons, to which are fixed lightened cross bulkheads. Over this framework, two thin 3-ply skins are tacked spirally, as was described in the D III Pfalz report. The body is entirely without internal wire bracing. There is a strong bulkhead immediately behind the engine, and forward of this the 3-ply skin drops almost to the level of the engine bearers, as may be seen in the photographs. The sides of the engine are enclosed by aluminium cowls, and the front is covered by the radiator. An aluminium cowl rounds off the lower part of the nose, and joins the 3-ply of the body.

The pilot's seat is missing, but it was supported on a steel tubular framework, which remains, and is illustrated in

Fig. 8. It should be noticed from this sketch, that the seat is adjustable both horizontally and vertically, there being three possible positions horizontally, and two vertically. The pilot's backrest is a simple strip of webbing attached to the sides of the fuselage, and the anchorage points for the safety belt are exactly as on the D III machine. The body tapers consistently towards the rear, and finishes in a vertical knife-edge, about 16 in. deep.

Tail

The body and fin are no longer integral, as in the D III, but the fin is simply a self-contained unit of welded-steel tube and fabric, bolted into its place. The fixed horizontal tail plane, however, is integral with the body, although the joint between fuselage and tail plane is an abrupt angle. The tail plane spars pass right through the body, and are connected by ribs lightened roughly by the boring of many circular holes.

Not only is the angle of incidence of the tail plane not adjustable, but the plane is incapable of removal. The camber is symmetrical, and its centre line is not only parallel to, but also in line with the crankshaft.

The balanced and divided elevators (in the D III the elevator was in one piece) are hinged by means similar to the aileron hinges, and from the sketch, Fig. 10, which shows the manner of removal of the hinge-rod, it will be noticed that the leading edge of the elevator is a steel tube, flattened to a vertical oval in the unbalanced portion, and to a horizontal oval in the balanced piece. The elevators are constructed throughout of welded steel tube, and the balanced rudder has the same construction.

The tail skid is a sturdy piece of ash with the usual steel shoe, and is balanced about its middle. The upper half is encased in the fuselage, and the shock absorber is of double coil steel spring.



Three-quarter rear view of the D XII Pfalz

Fig. 9 shows the framework construction at the rear of the fuselage.

Undercarriage

This component was not salvaged, and in the scale drawings the D III undercarriage has been supplied, as the two are conjectured to be substantially similar. From the sockets on the fuselage, it is clear that the limbs of the undercarriage vee finished in ball joints.

The following particulars regarding the undercarriage are taken from a French source. It is of the same type as that shown in dotted lines in the scale drawings, but the centre line of the axle is vertically underneath the leading edge of the lower planes, and $31\frac{1}{2}$ in. below this leading edge at the centre section. The track is given as 61 in. in the French drawings.

Engine and Mounting

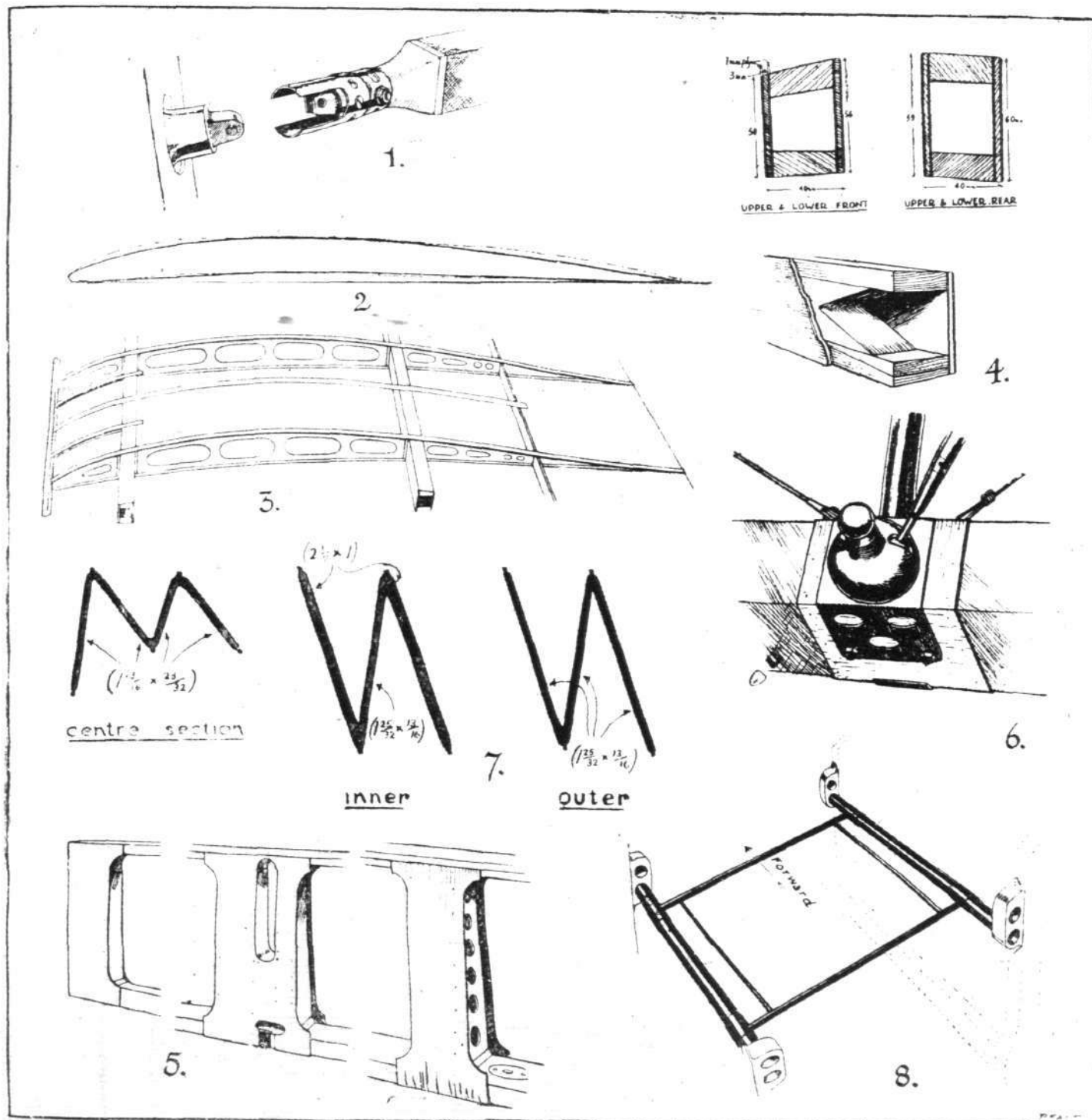
The engine, a 180 h.p. Mercedes (reported to be No. 42932, B.N. 827, M.N. 63, guaranteed till 30/1/19), is carried on rectangular-section ash bearers ($3\frac{1}{2}$ in. by $1\frac{1}{2}$ in.), which are lightened in places to I section. At the front end, the bearers project a few inches beyond the U-shaped front bulkhead. Two other similarly-shaped bulkheads support the bearers

in the places shown by dotted lines in the side view of the scale drawings, and at the rear the bearers are mortised into the behind-engine bulkhead, so that the end of the bearers are flush with the rear surface of the bulkhead. The top of the bearers is covered on either side with a 3-ply shell which extends to the side of the fuselage. In the three-quarter front view photograph may be seen an aluminium scoop (there is also one on the starboard side), which leads air round the crankcase for cooling purposes. The air escapes by holes which are visible just above the leading edge of the lower plane.

Radiator

The radiator no longer occupies the position it had on the D III model—i.e., in the centre section—but now closely follows Fokker practice. Fig. 11 shows the shape and construction, and it will be noticed that the whole radiator is situated above the crankshaft. The tank at the head of the radiator is of sheet brass, covered with an aluminium lacquer.

The construction, it will be observed, is very simple. A large number of oval-section tubes of thin brass (9 mm. by 4 mm. cross section), are arranged vertically between the



Some constructional details of D XII Pfalz.—1. Attachment of bottom wing spar to body. 2. Top plane section compared with R.A.F. 14. 3. Spars and ribs. 4. Reinforcement of wing spars at point of attachment of struts. 5. Strong support of false spar, to which aileron is hinged. 6. Spar fitting. 7. Diagrams of struts. 8. Tubular support for pilot's seat.

header tank and the radiator bottom, and are supported by two intermediate shelves. The tubes are staggered, and have their cross section inclined at a slight angle to the line of flight, so that the air currents have no straight path, but must impinge upon all the tubes in their course through the radiator. There is a peculiar aluminium "blinker" on the starboard side, permanently fixed edge-wise to the line of flight. Its probable purpose is to prevent the propeller swirl from altogether missing the starboard part of the radiator, by deflecting the current.

The fact that it is fixed on the starboard side, and that the propeller turns in an anti-clockwise direction when seen from the front, gives support to this view.

Two aluminium shutters are fitted behind the radiator, one each side—the tops can be seen in Fig. 11—and are worked positively and independently by means of cables.

The radiator is supported by two sheet-steel brackets, which are fitted to the foremost bulkhead, a few inches above the engine bearers. (See three-quarter front view photograph.)

Petrol System

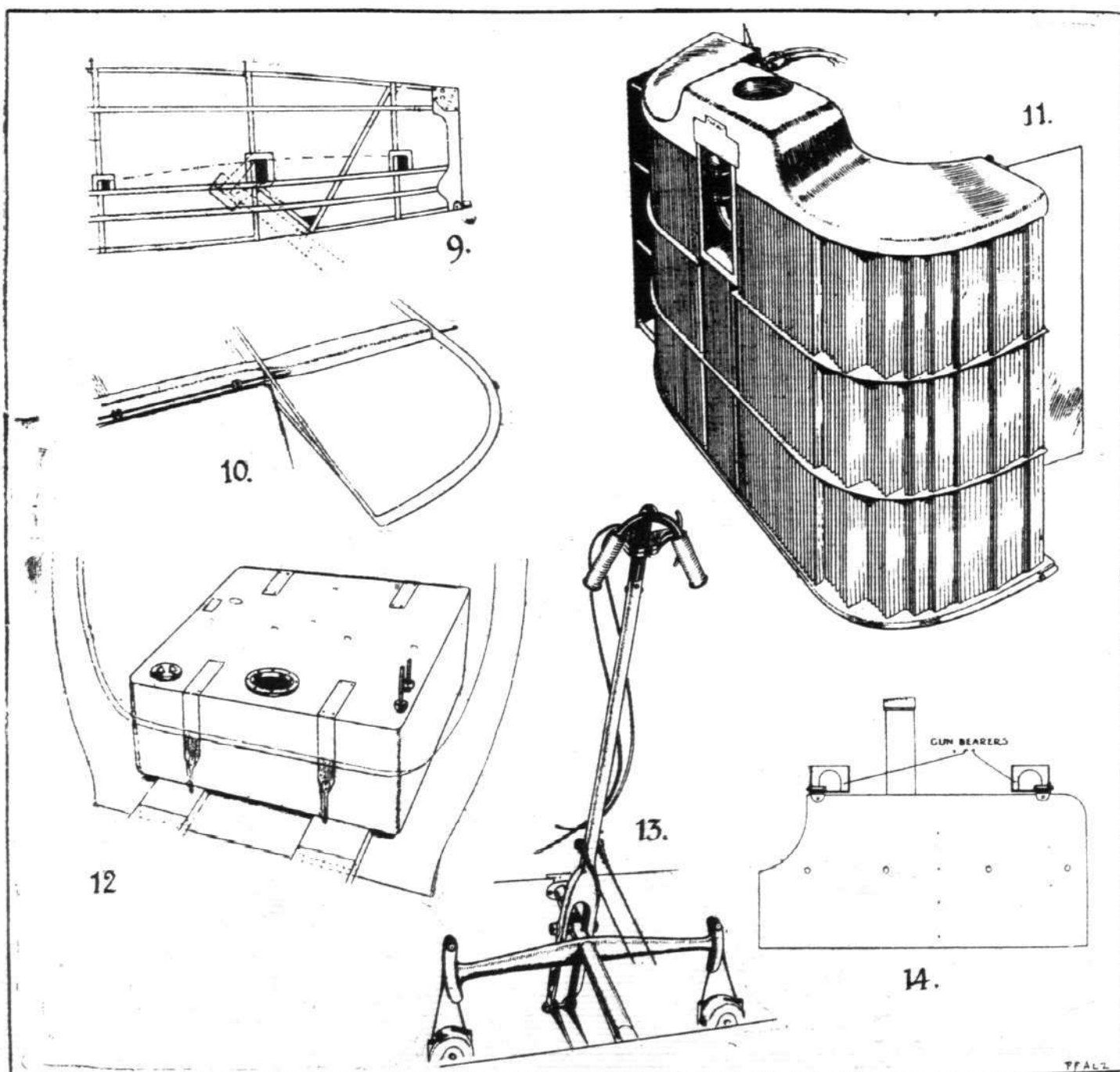
As in the D VII Fokker, both petrol tanks are inside the fuselage. It will be seen that the seat is placed rather far back, and in connection with this, it is remarked that the main petrol tank (sketched in Fig. 12) is placed low down in the fuselage underneath the rudder bar, and is covered

with a 3-ply foot board. Its capacity is 16.1 galls. The auxiliary tank is slung from the gun bearers, as shown in Fig. 14, and has a capacity of 2.6 galls. This gives a total petrol capacity of approximately 18½ galls. Both tanks work under pressure. The usual Mercedes oil tank is present, and holds, roughly, 2 galls.

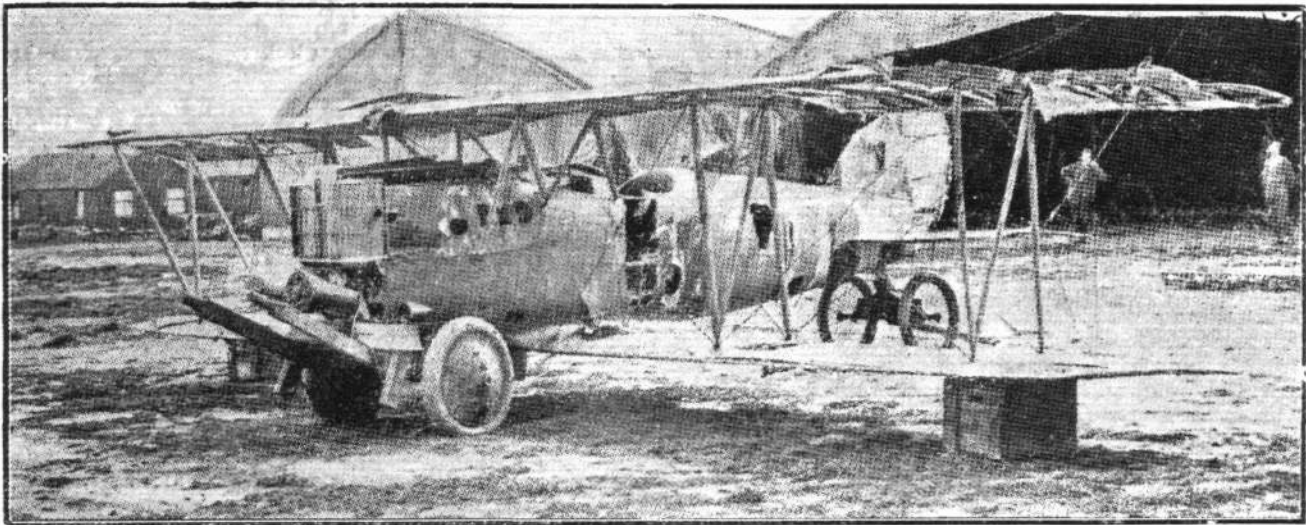
The throttle is a simple lever, without quadrant or ratchet, which is coupled to the carburettor by light gauge steel tubing, and there is no sign of there having been any inter-connected throttle on the control lever. The welded exhaust pipe points outwards and downwards, and is visible in several illustrations.

Controls

The stick and its connections are both clearly explained by the sketch (Fig. 13). It will be noticed that only the gun triggers are found near the handles. The rudder bar is precisely similar to that of the D III Pfalz, and has the same adjustment. From the photographs it will be noticed that the cables are enclosed in the body for the greater part of their length and that the upper elevator cable passes right through the fixed tail plane. The aileron cables pass in the usual way through the lower wings, and are protected there by rolled tubes of varnished paper. The place where they leave the lower plane and pass upwards to the aileron lever is marked in the drawings and photographs and the pulleys at this point are of aluminium, and are neatly enclosed in cases of light-gauge sheet steel.



Some more constructional details of D XII Pfalz.—9. Framework construction of rear of fuselage. 10. Sketch shows long hinge-bolt of elevator. 11. The radiator. 12. Main petrol tank. 13. Controls. 14. Diagram of gun mounting.



Three-quarter front view of D XII Pfalz

Armament

In common with the undercarriage and many instruments, both guns had been removed before the machine was inspected, but they were obviously of the Spandau type, fixed, and firing through the propeller path by the usual clutch and synchronising gear. The triggers are on the control lever, and are illustrated in Fig. 13. As in the Fokker biplane, two strong steel channels are fitted under the guns, and over the engine. They are visible in all three photographs, and in the scale drawings. The double ammunition box is of sheet aluminium, but has a tinplate top, and holds 400 rounds for each gun. It would appear that links were used between the cartridges, as no special receptacle for the usual web belt could be found. A link and cartridge-case deflector is fitted to the top of the cowl.

Instruments

These were not salvaged, and all that can be definitely stated is that the compass was of the Pathfinder type, and was fixed inside the cockpit. No dashboard was used, but the instruments had been distributed around the cockpit. It is reported that the pilot was provided with a parachute, which was folded into the seat, and acted as a cushion, but these fittings were not salvaged.

Propeller

This is of Heine make, No. 26206; diameter 2,780, pitch 2,000. It has eight laminations of mahogany and walnut.

Fabric and Painting

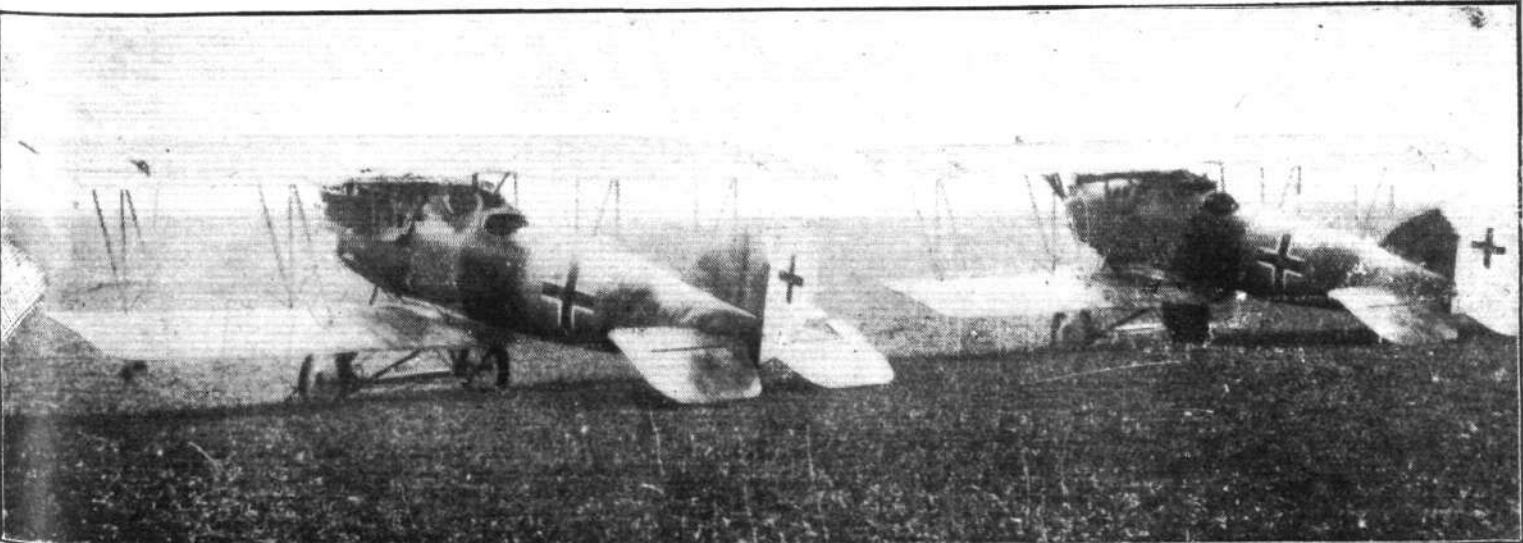
The fabric is of the usual colour-printed variety, and the body was painted dark purple from nose to rear of engine; bluish-grey to pilot's cockpit; and a dark green shading into a light pea-green extending to the tail. The fin and rudder are creamy-white, as is the part of the body above the tail planes, but the tail planes themselves, and the underneath portion of the body at the tail, are painted in broad stripes of alternate black and white. The photographs help to identify these various divisions.

D XII TYPE—Schedule of Principal Weights

	lbs.	ozs.
Fuselage, without engine, guns, auxiliary tank or oil tank, but with main tank and tail skid	257	0
Starboard lower wing, with control cables, but no bracing wires. Only one side fabric covered	46	0
Upper wing, with bracing wires, but only one side fabric covered	127	0
One centre section M strut	7	4
Radiator	44	8
Brass oil tank	5	1
Auxiliary petrol tank	7	8
One outer N strut	8	9
One inner N strut	10	6
Fin (covered)	3	2
Aileron (covered)	7	12
Aileron hinge rod	0	8
3-ply tail plane (partly estimated)	19	0
Aluminium nose cowl	3	14
Cockpit cowl and padding	2	6
One aluminium side cowl	2	12
Ammunition magazine	7	12
Two clutches for synchronising gear	5	13
Two gun channels	5	5

The weights of the main components of the earlier Pfalz—D III type—are given below for comparison:—

	lbs.	ozs.
Fuselage, without engine, guns, or empennage, but with tanks and all fittings	295	0
One lower plane, covered, but without bracing wires	49	0
Complete upper plane, covered, with ailerons, bracing wires, radiator, and gravity tank	225	0
One centre section strut	9	6
One U interplane strut	8	13



A batch of surrendered Pfalz D XII German aeroplanes

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

The Committee, 1919

Brig.-Gen. The Duke of Atholl, K.T., M.V.O., D.S.O.
(Chairman).
Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S. (Vice-Chairman).
Major-Gen. Sir W. S. Brancker, K.C.B.
Mr. Ernest C. Bucknall.
Mr. G. B. Cockburn.
Lieut.-Col. John D. Dunville, R.A.F.
Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F.
Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F.
Col. F. Lindsay Lloyd, C.M.G.
Lieut.-Col. F. K. McClean.
Brig.-Gen. E. M. Maitland, D.S.O., R.A.F.
Lieut.-Col. J. T. C. Moore-Brabazon, M.P.
The Rt. Hon. Lord Northcliffe.
Lieut.-Col. Alec Ogilvie, R.A.F.
Mr. F. Handley Page.
Col. C. R. Samson, D.S.O., R.A.F.
Mr. A. Mortimer Singer.
Mr. T. O. M. Sopwith.

The Royal Aero Club

In accordance with the Resolution passed unanimously at the Annual General Meeting of the Royal Aero Club on March 31, 1919, the Subscription for Members elected on or after May 31, 1919, will be £7 7s. per annum and the Entrance Fee £5 5s.

FLYING SERVICES FUND COMMITTEE

A Meeting of the Flying Services Fund Committee was held on Monday, the 14th inst., when there were present:—Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., in the Chair, Mr. Chester Fox, and Mr. Harold E. Perrin, Secretary.

Chairman.—On the motion of Lieut.-Col. T. O'B. Hubbard, seconded by Mr. Chester Fox, Brig.-Gen. R. H. More, C.M.G., was elected Chairman for the current year.

Grants and Allowances.—The following Grants and allowances were made:—

(28) A Grant of £5 to an Ex-A.M.I. in the Royal Naval Air Service who had been incapacitated on active service.

(99) A continued allowance of £2 a month for six months to the mother of a Sergeant in the Royal Air Force who had died on active service.

(112) A continued allowance of £2 a month for six months to the widow of a 1st Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(150) The school fees of two children of the widow of a Private in the Royal Air Force who had been killed on active service.

(167) A Grant of £10 to the widow of a Captain in the Royal Air Force who had died on active service.

(168) An allowance of £2 a month for six months to the mother of a Private in the Royal Air Force who had died on active service.

(169) An allowance of £2 a month for six months to the widow of a Private in the Royal Flying Corps who had died on active service.

(172) An allowance of £2 a month for six months to the

widow of a Private in the Royal Air Force who had been killed on active service.

(173) An allowance of £2 a month for six months to the widow of a 3rd Class Air-Mechanic in the Royal Air Force who had died on active service.

(174) An allowance of £2 a month for six months to the widow of a Private in the Royal Air Force who had died on active service.

(175) An allowance of £1 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Air Force who had died on active service.

(177) An allowance of £2 a month for six months to the widow of a 3rd Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(182) An allowance of £2 a month for six months to the widow of a Corporal in the Royal Air Force who had been killed on active service.

(183) An allowance of £1 a month for six months to the mother of a 3rd Class Air-Mechanic in the Royal Flying Corps who had died on active service.

(184) An allowance of £2 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had died on active service.

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

Administered by the Royal Aero Club

For the benefit of Officers, Non-Commissioned Officers and Men of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

Brig.-Gen. R. H. MORE, C.M.G. (Chairman).

Mr. CHESTER FOX.

Lieut.-Col. T. O'B. HUBBARD, M.C., R.A.F.

Lieut.-Col. C. E. MAUDE, R.A.F.

Secretary:

H. E. PERRIN

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

Subscriptions

	£	s.	d.
Total subscriptions received to April 15, 1919..	14,941	1	1
Collections made at Church of England Parade Services in the South-Western Area, Headquarters, Royal Air Force, Salisbury ..	24	0	0
Collections made at Church Services held at No. 143 Squadron, Royal Air Force, Detling ..	1	0	0

Total, April 22, 1919 14,966 1 1

Offices: THE ROYAL AERO CLUB,

3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

ROLL OF HONOUR

Published April 15.

Killed

Bainbridge, Capt. W. A. de L. Y. Thornton, Lieut. F. O.
Fenwick, Lieut. F.

Died

Bell, Sec. Lieut. A. McC. Wood, Maj. H. F.

Repatriated

The following officers of the R.A.F. have been repatriated:—
Macintyre, Lieut. D. H. Withers, Lieut. K. G.
Porter, Capt. C. T.

Published April 22.

Killed

Burnay, Lieut. P. S. Sullivan, Sec. Lieut. F. H.
Ottewell, Lieut. J. M.

Died

De Kock, Sec. Lieut. D. W. McDonald, Lieut. J. J.
Jacob, Lieut. J. V. R. Wells, Sec. Lieut. S.

Died of Injuries
Westall, Sec. Lieut. A.

Helium Gas for Airships

It appears from a recent statement of the United States Bureau of Mines that the discovery of helium in Kansas, Oklahoma and Texas was due to the work of the Bureau acting on the suggestion of two British officials. The process may roughly be described as follows: "Natural gas is collected and compressed and cooled down in the same

kind of apparatus used to liquefy air. As the cooling process continues, everything is liquefied out long before the helium. The regular hydrocarbon series making up 70 per cent. of the natural gas liquefies first, and then the nitrogen, constituting about 30 per cent., is condensed at a temperature of 195 deg. C. below zero. It requires 268 deg. C. below ordinary zero to liquefy helium, so this gas remains to be collected when other elements have been liquefied."

THE TRANSATLANTIC FLIGHT

WHILE the weather continues to delay those competitors who are ready to start, the list of entries gradually grows. It now numbers nine, the latest being an Alliance biplane, fitted with a 450 h.p. Napier Lion engine, entered by the Alliance Aeroplane Co., Ltd., of Hammersmith. Mr. J. A. Peters is nominated as the pilot, and Capt. W. R. Curtis, R.A.F., as the navigator and assistant pilot.

The continued bad weather also gives the Short machine "Shamrock" a further chance, as it appears that the damage sustained in its dip into the sea off Anglesey last week can soon be put right. The machine left Eastchurch at 3.15 p.m. on April 18 to fly to the Curragh, and they passed over Holyhead about 7.20 p.m. When about 12 miles out at sea the engine stopped, and as Maj. Wood, the pilot, could not get it going again the machine was turned and eventually alighted about half a mile from the shore. Maj. Wood and Capt. Wyllie were rescued by a motor launch; the machine, 22 hours later, was towed to Holyhead and hoisted ashore. Mr. J. Lankester Parker, who was flying a single-seater Short, on seeing the "Shamrock" in difficulties, turned about and landed in a field not far from the shore. From subsequent investigation it appeared that the cause of the stoppage was an air lock in the petrol system. The only damage sustained appears to be that due to the immersion of the planes in the sea, and it is hoped that the machine will be ready for another attempt in about a week's time. In the event of the Atlantic being crossed before it can be ready to start the "Shamrock" will try for duration and long-distance records.

Mr. Raynham, on April 17, made a trial flight of about half an hour's duration with his Martinsyde machine at St. John's, and everything appeared to be working satisfactorily. According to a message from St. John's Mr. Raynham and Mr. Hawker have mutually agreed to eliminate the risks which competitive eagerness would entail by a hurried departure without full and thorough preparations. In other words they will both wait until the weather conditions are sufficiently

settled to give them a good chance of making the journey across.

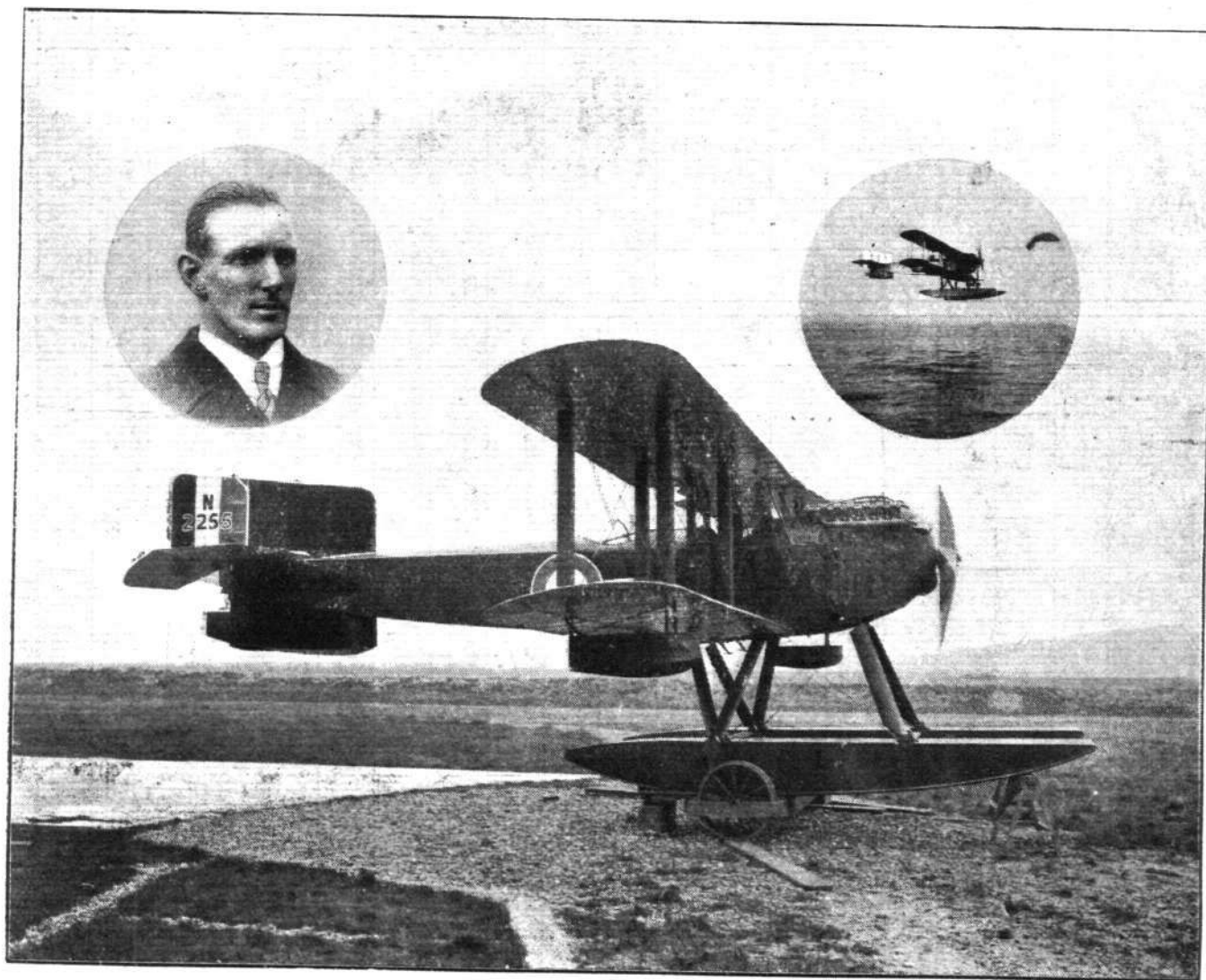
Experiments have been carried out at St. John's in the hope of finding better weather conditions at a high level, but they have proved abortive so far, as the trial balloons disappear in the mist at 6,000 feet altitude.

The Handley-Page machine is now on its way to St. John's. It is expected that the pilots will be Maj. H. G. Brackley, D.S.O., R.A.F., and Admiral Mark Kerr, with Maj. T. Gran, R.A.F., as navigator and wireless expert. An aerodrome is being prepared for the machine at Harbour Grace.

A representative of Messrs. Boulton and Paul is reported to have arrived at St. John's to arrange for an aerodrome and supplies, and the Whitehead machine to be flown by Capt. Arthur Payze is expected, while the arrival of one of the "Felixstowe Furies" which may attempt the flight *hors concours*, is anticipated.

Capt. A. G. D. West, R.A.F., has been appointed navigator to accompany Mr. Sydney Pickles on the Fairey (360 h.p. Rolls-Royce engine) seaplane.

A test made on April 17 with one of the N.C. flying boats was disappointing. With a full load the four Liberty motors failed to get the flying boat off the water after 20 minutes. In a trial on Tuesday, however, the vessel lifted eleven passengers. Following this comes an announcement from Washington that three flying boats of this type, each carrying a crew of five, will attempt a non-stop flight to Ireland early next month. In the meantime a detachment of observers and mechanics of the Naval Air Station at Rockaway Beach, who have been selected to aid the United States Navy's plans for the Transatlantic flight, have left Rockaway in the "Aroostook" for Newfoundland. It is understood that the "Aroostook" will proceed later to the Azores to act as a supply ship. The cruisers "Columbia" and "Baltimore" have also been detailed to assist in the flight.



THE TRANSATLANTIC RACE.—Up to the present the Fairey—Rolls-Royce machine is the only seaplane entered in this country. This photograph shows the standard Fairey 3 C type. The machine to be used for the Transatlantic attempt is very similar in general appearance, although differing in various details. The insets show the machine in flight and Mr. Sidney Pickles, the pilot. Capt. A. G. D. West, R.A.F., has been selected as the navigator.

DRAWING OFFICE DATA

By E. O. WILLIAMS, B.Sc.Eng. (Lond.), Assoc. M. Inst. Civil Engineers, Assoc. Fellow R.Ae.Soc.G.B.

(Continued from page 518)

III.—STRUTS (OTHER THAN STREAM-LINE).

(a).—Beams and Struts of I-Section.

APART from the stream-line interplane struts, there are used on an aeroplane numerous other struts, the section of which depends on the particular function

of the strut and on its position in the aeroplane structure. Manufacturing considerations will of necessity also influence the section chosen. Of the different sections in use, probably the I-section is

FLIGHT

B IN INCHES

IN INCHES	.8			.9			1.0		
	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}
.8	.54	.0338	.0815	.60	.0360	.0909	.66	.0422	.1035
.9	.57	.0475	.1053	.63	.0533	.1184	.69	.0592	.1316
1.0	.60	.064	.128	.66	.0718	.1437	.72	.0796	.1591
1.1	.63	.0838	.1515	.69	.0936	.171	.75	.1036	.1896
1.2	.66	.1062	.1772	.72	.119	.1985	.78	.1314	.219
1.3	.69	.132	.203	.75	.1472	.2265	.81	.163	.2506
1.4	.72	.162	.2316	.78	.18	.2673	.84	.1988	.284
1.5	.75	.198	.26	.81	.217	.2995	.87	.2386	.3193
1.75				.86	.326	.373	.94	.358	.409
2.0							1.05	.548	.659
2.25									
2.5									
2.75									
3.0									
3.25									
3.5									
3.75									

MOMENTS OF INERTIA, STRENGTH MODULI AND AREAS OF I SECTIONS.

B IN INCHES

IN INCHES	1.1			1.2			1.3		
	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}
1.1	.60	.064	.128	.66	.0718	.1437	.72	.0796	.1591
1.2	.63	.0838	.1515	.69	.0936	.171	.75	.1036	.1896
1.3	.66	.1062	.1772	.72	.119	.1985	.78	.1314	.219
1.4	.69	.132	.203	.75	.1472	.2265	.81	.163	.2506
1.5	.72	.162	.2316	.78	.18	.2673	.84	.1988	.284
1.75				.81	.217	.2995	.87	.2386	.3193
2.0				.86	.326	.373	.94	.358	.409
2.25							1.05	.548	.659
2.5									
2.75									
3.0									
3.25									
3.5									
3.75									

MOMENTS OF INERTIA, STRENGTH MODULI AND AREAS OF I SECTIONS.

Fig. 10

Fig. 11

employed more extensively than any other. This is due to the fact that the I-section is fairly economical—although not necessarily the best—as applied to a strut. It is also reasonably cheap from a manufacturing point of view. As a strut, the I-section is frequently met with in such component parts of an aeroplane as body struts and body *longerons*, while, of course, those of the wing spars subjected, in addi-

tion to their main functions as beams to an end thrust, are also to be considered as laterally loaded struts.

The calculations necessary for determining the exact dimensions of a strut or beam to carry a given load are generally a matter of trial and error, and in order to facilitate the choice of a section of suitable dimensions it has been the writer's experience that a series of tables giving areas, moments of

D IN INCHES	B 1 IN INCHES						B 1 IN INCHES					
	1.4			1.5			1.75			2.0		
	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}
1.0	.96	.1108	.2215	.1270	.1815							
1.1	.99	.1436	.261	.1271	.1816	1.05	.1538	.28	.1532	.207		
1.2	1.02	.182	.3032	.1272	.1819	1.08	.1941	.3235	.1556	.2075	.123	.207
1.3	1.05	.2245	.346	.1273	.1822	1.11	.240	.3695	.1582	.2084	1.26	.2785
1.4	1.08	.273	.39	.1278	.1824	1.14	.2905	.415	.1586	.2088	1.29	.334
1.5	1.11	.3275	.4365	.128	.1828	1.17	.349	.465	.1574	.210	1.32	.4035
1.75	1.185	.486	.556	.1285	.1835	1.245	.519	.593	.158	.2106	1.395	.597
2.0	1.435	.741	.741	.155	.2215	1.505	.789	.789	.189	.25	1.68	.912
2.25	1.522	1.00	.89	.156	.223	1.59	1.069	.951	.1884	.2512	1.77	1.227
2.5	1.61	1.312	1.05	.157	.2242	1.68	1.395	1.116	.1892	.2522	1.85	1.6
2.75	1.70	1.708	1.241	.1578	.2255	1.77	1.775	1.291	.1902	.2538	1.94	2.026
3.0	1.79	2.085	1.39	.1587	.2265	1.86	2.21	1.472	.191	.2545	2.03	2.51
3.25	1.88	2.55	1.57	.1595	.228	1.95	2.70	1.661	.1918	.2557	2.12	3.075
3.5	1.96	3.08	1.76	.1609	.230	2.03	3.26	1.862	.1926	.2565	2.205	3.675
3.75	2.05	3.665	1.935	.1619	.2313	2.12	3.87	2.062	.1934	.258	2.29	4.375
MOMENTS OF INERTIA, STRENGTH MODULI AND AREAS OF I SECTIONS												
D IN INCHES	B 1 IN INCHES						B 1 IN INCHES					
	2.0			2.25			2.5			2.75		
	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}	A	I _{xx}	I _{yy}
2.0	2.47	4.67	2.60	2.44	4.44	2.64	2.47	4.67	2.60	2.44	4.44	2.64
2.25	2.53	4.11	2.348	2.43	4.43	2.56	2.53	4.11	2.348	2.43	4.43	2.56
2.5	2.60	3.44	2.119	2.42	4.42	2.45	2.60	3.44	2.119	2.42	4.42	2.45
2.75	2.67	2.88	1.845	2.41	4.41	2.39	2.67	2.88	1.845	2.41	4.41	2.39
3.0	2.74	2.30	1.585	2.40	4.40	2.30	2.74	2.30	1.585	2.40	4.40	2.30
3.25	2.81	1.805	1.345	2.39	4.39	2.25	2.81	1.805	1.345	2.39	4.39	2.25
3.5	2.88	1.359	1.123	2.38	4.38	2.20	2.88	1.359	1.123	2.38	4.38	2.20
3.75	2.95	1.031	1.031	2.37	4.37	2.15	2.95	1.031	1.031	2.37	4.37	2.15
4.0	3.02	.785	.785	2.36	4.36	2.10	3.02	.785	.785	2.36	4.36	2.10
4.25	3.09	.605	.605	2.35	4.35	2.05	3.09	.605	.605	2.35	4.35	2.05
4.5	3.16	.458	.458	2.34	4.34	2.00	3.16	.458	.458	2.34	4.34	2.00
4.75	3.23	.339	.339	2.33	4.33	1.95	3.23	.339	.339	2.33	4.33	1.95
5.0	3.30	.245	.245	2.32	4.32	1.90	3.30	.245	.245	2.32	4.32	1.90
5.25	3.37	.175	.175	2.31	4.31	1.85	3.37	.175	.175	2.31	4.31	1.85
5.5	3.44	.125	.125	2.30	4.30	1.80	3.44	.125	.125	2.30	4.30	1.80
5.75	3.51	.085	.085	2.29	4.29	1.75	3.51	.085	.085	2.29	4.29	1.75
6.0	3.58	.055	.055	2.28	4.28	1.70	3.58	.055	.055	2.28	4.28	1.70
6.25	3.65	.035	.035	2.27	4.27	1.65	3.65	.035	.035	2.27	4.27	1.65
6.5	3.72	.025	.025	2.26	4.26	1.60	3.72	.025	.025	2.26	4.26	1.60
6.75	3.79	.015	.015	2.25	4.25	1.55	3.79	.015	.015	2.25	4.25	1.55
7.0	3.86	.01	.01	2.24	4.24	1.50	3.86	.01	.01	2.24	4.24	1.50
7.25	3.93	.005	.005	2.23	4.23	1.45	3.93	.005	.005	2.23	4.23	1.45
7.5	4.00	.005	.005	2.22	4.22	1.40	4.00	.005	.005	2.22	4.22	1.40
7.75	4.07	.005	.005	2.21	4.21	1.35	4.07	.005	.005	2.21	4.21	1.35
8.0	4.14	.005	.005	2.20	4.20	1.30	4.14	.005	.005	2.20	4.20	1.30
8.25	4.21	.005	.005	2.19	4.19	1.25	4.21	.005	.005	2.19	4.19	1.25
8.5	4.28	.005	.005	2.18	4.18	1.20	4.28	.005	.005	2.18	4.18	1.20
8.75	4.35	.005	.005	2.17	4.17	1.15	4.35	.005	.005	2.17	4.17	1.15
9.0	4.42	.005	.005	2.16	4.16	1.10	4.42	.005	.005	2.16	4.16	1.10
9.25	4.49	.005	.005	2.15	4.15	1.05	4.49	.005	.005	2.15	4.15	1.05
9.5	4.56	.005	.005	2.14	4.14	1.00	4.56	.005	.005	2.14	4.14	1.00
9.75	4.63	.005	.005	2.13	4.13	0.95	4.63	.005	.005	2.13	4.13	0.95
10.0	4.70	.005	.005	2.12	4.12	0.90	4.70	.005	.005	2.12	4.12	0.90

Fig. 12.

Fig. 13.

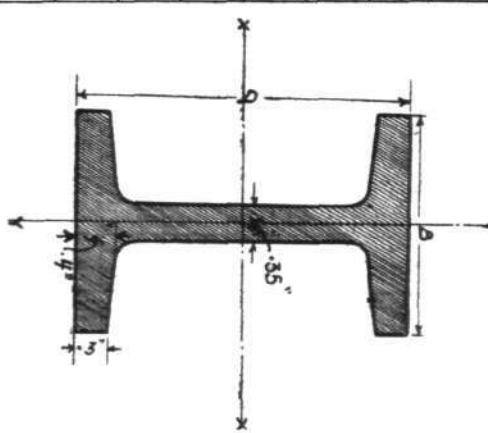
inertia, and strength moduli for I-sections of various progressive dimensions, ranging from .8 (inch)⁴ to 5.75 (inches)⁴, are most useful. Such a series is shown in Figs. 10 to 22. (It has not been possible, from considerations connected with publication, to print these tables actual size, but in an actual drawing, the size would, of course, conform to the standards indicated in an earlier part of these notes.—ED.)

With regard to the method of employing these tables, this will be fairly obvious. Generally speaking,

a stress diagram has been prepared beforehand from which is obtained the load to which any particular strut will be subjected. Use is then made of the strut

formula $P = \frac{I}{f_c A} + \frac{l^2}{\pi^2 E I}$ or of any other strut

formula that may be required by the authorities (such as that of the R.A.E.). For any given material (which, in the case under consideration, is usually

B 1 1/4 IN INCHES												
D IN INCHES	2.75				3.0				3.25			
	A	I _{xx}	I _{yy}	Z _{xy}	A	I _{xx}	I _{yy}	Z _{xy}	A	I _{xx}	I _{yy}	Z _{xy}
3.75	2.99	6.41	3.42	1.138	8.26	3.16	6.92	3.69	1.473	9.83	3.33	7.42
3.5	2.91	5.41	3.094	1.136	8.24	3.08	5.84	3.34	1.472	9.83	3.25	6.275
3.25	2.82	4.50	2.87	1.135	8.23	2.99	4.92	3.03	1.471	9.83	3.17	5.29
3.0	2.73	3.757	2.502	1.133	8.23	2.9	4.07	2.715	1.47	9.8		
2.75	2.64	3.04	2.212	1.132	8.22							
2.5												
2.25												
2.0												
1.75	1.726	9/8	1.05	.955	.695							
1.5												
1.4												
1.3												
1.2												
1.1												
1.0												
.9												
.8												
DIMENSIONS WHEN D IS 2" OR GREATER, BUT LESS THAN 4"												
												
3.5	A	I _{xx}	I _{yy}	Z _{xy}	A	I _{xx}	I _{yy}	Z _{xy}				
3.25												
3.0												
2.75												
2.5												
2.25												
2.0												
1.75												
1.5												
1.4												
1.3												
1.2												
1.1												
1.0												
.9												
.8												
APPROXIMATELY GIVEN IN FIG. 15												
3.51	7.93	4.23	2.332	1.332	3.7	8.46	4.57	2.845	1.519			
3.42	6.72	3.84	2.33	1.33								
3.25												
3.0												
2.75												
2.5												
2.25												
2.0												
1.75												
1.5												
1.4												
1.3												
1.2												
1.1												
1.0												
.9												
.8												

APPROXIMATELY GIVEN IN FIG. 15

FIG. 15

APPROXIMATELY GIVEN IN FIG. 15

FIG. 15

Fig. 14.

Fig. 15.

if the depth of the section is increased from 6.62 ins. to 8.58 ins., the area is decreased, for the same value of the moment of inertia, I , from 14.1 sq. ins. to 10 sq. ins., which represents a very considerable saving in weight. This general example should be sufficient to indicate the advantages attending the choice of a deep section for a beam wherever other considerations permit.

The increase in depth of the I-section is accompanied by a decrease in the moment of inertia about the vertical axis, and, therefore, the deep section is only advantageous for beams loaded in one plane only. For struts without any lateral loading the most economical section is that which has equal moment of inertia about both vertical and horizontal axes. With I-section struts, the most economical

B IN INCHES												D IN INCHES																								
D IN INCHES	2.75						3.0						3.25						3.5						3.75						4.0					
	A	I _{xx}	Z _{xx}	I _{yy}	Z _{yy}	A	I _{xx}	Z _{xx}	I _{yy}	Z _{yy}	A	I _{xx}	Z _{xx}	I _{yy}	Z _{yy}	A	I _{xx}	Z _{xx}	I _{yy}	Z _{yy}	A	I _{xx}	Z _{xx}	I _{yy}	Z _{yy}	A	I _{xx}	Z _{xx}	I _{yy}	Z _{yy}						
4.0	3.48	8.58	4.29	1.318	1.938	3.68	9.27	4.635	1.705	1.337	3.88	9.95	4.978	2.103	1.331	4.08	10.62	5.31	2.682	1.536	4.29	11.33	5.665	3.56	1.9	4.49	12.0	6.0	4.019	2.008						
4.25	3.59	9.15	4.304	1.32	1.9605	3.77	10.29	4.84	1.706	1.338	3.97	11.02	5.19	2.165	1.331	4.17	11.77	5.54	2.694	1.539	4.38	12.5	5.88	3.56	1.9	4.59	13.22	6.21	4.02	2.011						
4.5	3.68	11.09	4.91	1.32	1.9605	3.88	11.81	5.25	1.708	1.339	4.08	12.66	5.425	2.165	1.331	4.28	13.5	6.0	2.695	1.540	4.48	14.37	6.39	3.56	1.9	4.7	15.19	6.75	4.02	2.011						
4.75	3.78	12.5	5.27	1.321	1.961	3.99	13.46	5.66	1.709	1.340	4.17	14.38	6.05	2.166	1.333	4.39	15.33	6.46	2.696	1.541	4.59	16.32	6.87	3.56	1.9	4.79	17.21	7.25	4.021	2.012						
5.0	4.31	15.46	6.19	1.3048	1.903	4.55	16.61	6.65	1.944	1.296	4.77	17.75	7.1	2.448	1.518	5.0	18.96	7.99	3.048	1.753	5.23	20.12	8.05	4.044	2.158	5.45	21.34	8.54	4.548	2.284						
5.25	4.43	17.37	6.61	1.3067	1.995	4.66	18.66	7.11	1.963	1.309	4.88	19.96	7.6	2.467	1.519	5.14	20.25	8.1	3.048	1.754	5.35	22.62	8.68	4.049	2.158	5.57	23.9	9.1	4.847	2.285						
5.5	4.53	19.41	7.06	1.3086	1.997	4.78	20.89	7.6	1.982	1.322	5.0	22.28	8.11	2.486	1.520	5.23	23.45	8.61	3.048	1.755	5.43	25.25	9.19	4.049	2.159	5.67	26.62	9.7	4.584	2.285						
5.75	4.63	21.61	7.53	1.3105	1.999	4.89	23.23	8.1	2.001	1.365	5.12	24.75	8.61	2.486	1.521	5.3	26.4	9.2	3.070	1.756	5.55	27.8	9.68	4.049	2.160	5.8	29.66	10.32	4.570	2.285						
MOMENTS OF INERTIA STRENGTH MODULI AND AREAS																																				
MOMENTS OF INERTIA, STRENGTH MODULI AND AREAS																																				
OF I SECTIONS																																				
OF I SECTIONS																																				

MOMENTS OF INERTIA STRENGTH MODULI AND AREAS
OF I SECTIONS

MOMENTS OF INERTIA, STRENGTH MODULI AND AREAS
OF I SECTIONS

FIG. 18.

FIG. 19.

section is not a square section, but one in which the breadth of the flange is greater than the depth of the section. The accompanying tables give, by inspection, the two dimensions of a strut such that the moment of inertia is equal for both axes.

In the case of a body *longeron*, the depth of section which it is practicable to employ is limited to a certain extent by the fact that the *longeron* is bent,

in some cases to a very considerable extent, in the front portion of the body; hence, although steaming be resorted to, there is a limit to the depth of *longeron* which it is possible to bend to the desired curvature. With regard to the body struts, this restriction does not apply, as they are not to be bent, but as they have to be attached as neatly as possible to the *longerons* they cannot very well be made of larger

[illegible]

Fig. 20.

Fig. 21.

dimensions than the *longerons*, unless one resorts to tapering them, which means extra cost in manufacture. The most economical section is that which gives the greatest value of the ratio $\frac{\text{strength modulus}}{\text{area}}$.

Bearing this in mind, the method of employing the tables of moments of inertia, strength moduli, and areas of I sections may best be indicated by a numerical example

Let us suppose that from the stress diagram the

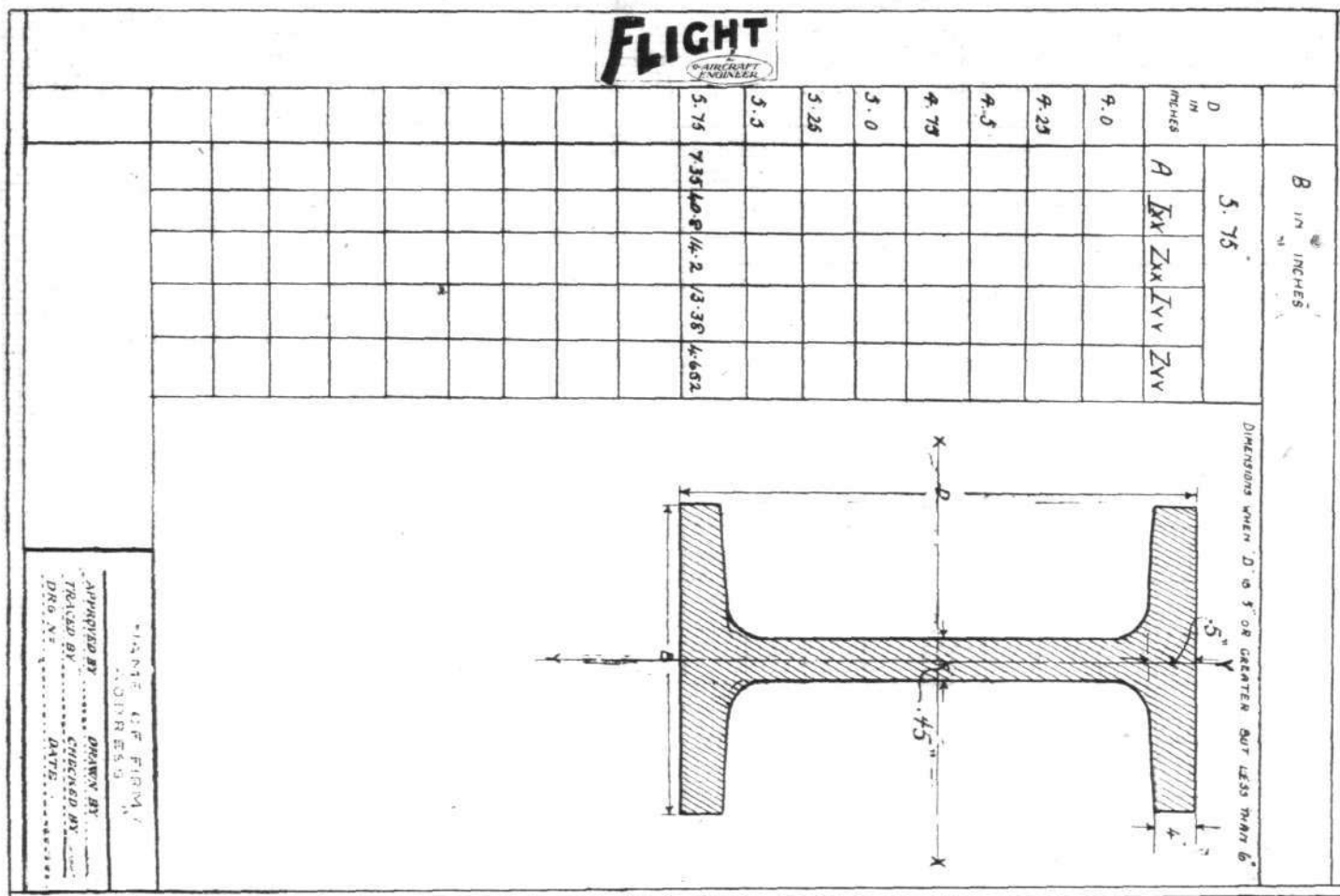


Fig. 22.

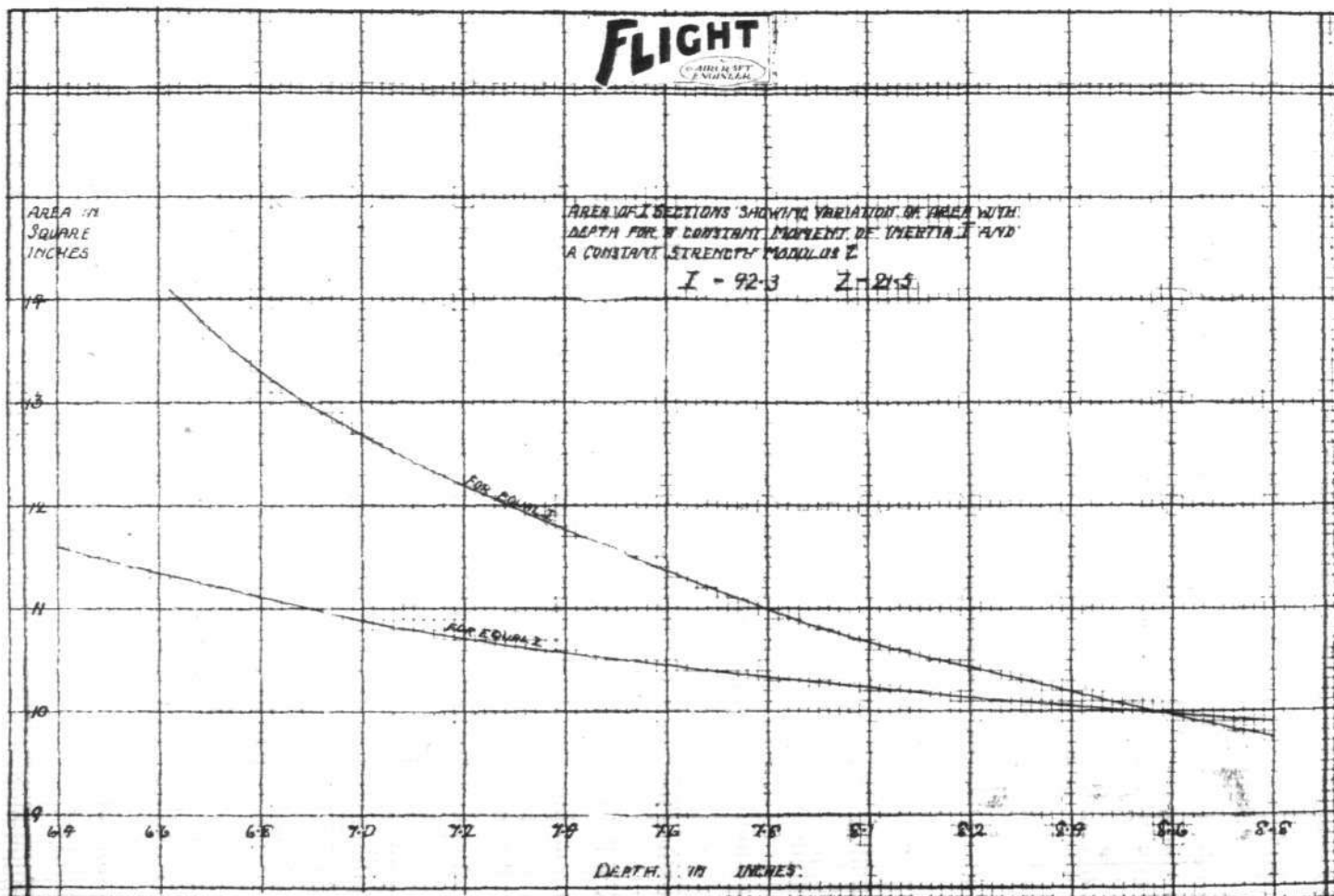


Fig. 23.

greatest load on a *longeron* has been found to be 1,000 lbs. in compression. Allowing for a factor of safety of 4, the value of P in the equation becomes 4,000 lbs. As the *longeron* will, in all probability, be of ash where the maximum load occurs, we obtain the value of f_c and E , which are for ash 6,250 lbs./square inch, and 1,600,000 respectively. Assuming that l , the free length of *longeron* in the bay where occurs the maximum load, is 20 ins. There then remains to determine the necessary I for the minimum A , bearing in mind that as the *longeron* is to be bent the depth of the section should not be too great. For a first trial, let us assume an I section in which D and B (see Fig. in table 10) are both 1.2 ins. From the tables, Fig. 11, it is found that for these dimensions the least moment of inertia I_{yy} is .0806, while the area is .90 sq. ins. Substituting these values in the strut formula, we have:

$$P = \frac{I}{\frac{1}{6,250 \times .90} + \frac{400}{9.87 \times 1,600,000 \times .0806}} = 2,092 \text{ lbs.}$$

This is not, it will be seen, high enough, as with a factor of safety of 4 the breaking load of the *longeron* should be 4,000 lbs. As the section is to be employed in a strut—i.e., in a compression member, and not in a beam—it should, to be economical, have the same moment of inertia around both axes. From the tables it is found that this is very nearly the case when $D = 1.1$ and $B = 1.5$. Fig. 12. I_{xx} then equals .1538 and $I_{yy} = .1552$. The area $A = 1.05$ sq. ins., which is not very much greater than that previously found. Substituting these values in the equation, we have:

$$P = \frac{I}{\frac{1}{6,250 \times 1.05} + \frac{400}{9.87 \times 1,600,000 \times .1538}} = 3,703 \text{ lbs.}$$

which is still not quite enough, although very nearly.

A third trial should give the desired result, but sufficient has been said to indicate the procedure.

(b).—"X" Sections compared with "I" Sections.

Good as are the results obtainable with an I section for members acting as struts, it does not follow that it is not possible to choose a section giving even better results. It would be interesting to examine how an "X" section, for instance, will compare with the I section for the same overall dimensions, when employed in a strut.

In Fig. 24 are shown two such sections, a symmetrical (square) X section and a square I section. Curves of least moment of inertia have been plotted for the two sections. In the case of the I section the least moment of inertia is, of course, that referring to the axis $A-A$, and this is the one employed for comparison. The curves clearly show that for overall sizes up to 1.45 ins. square there is very little to choose between the two sections; if anything, the I -section appears to be slightly the better of the two. For sizes above 1.45 ins. square, however, the X section begins to show a superiority which becomes quite marked when a size of 1.8 ins. square has been reached. Thus, for a side of 1.8 ins. square the moment of inertia of the I section is .275, whereas that of the X section is found to be .332. This is quite an appreciable difference, and would appear to indicate the advisability of employing the X section for struts carrying loads of such magnitude as to require, approximately, this size of section. For sizes of from 1.8 to 1.9 ins. square, the two curves run sensibly parallel. From this point onward the curves begin to converge, indicating that for sizes larger than 1.9 ins. square the superiority of the X section begins to be reduced.

In the body of an aeroplane there are quite a

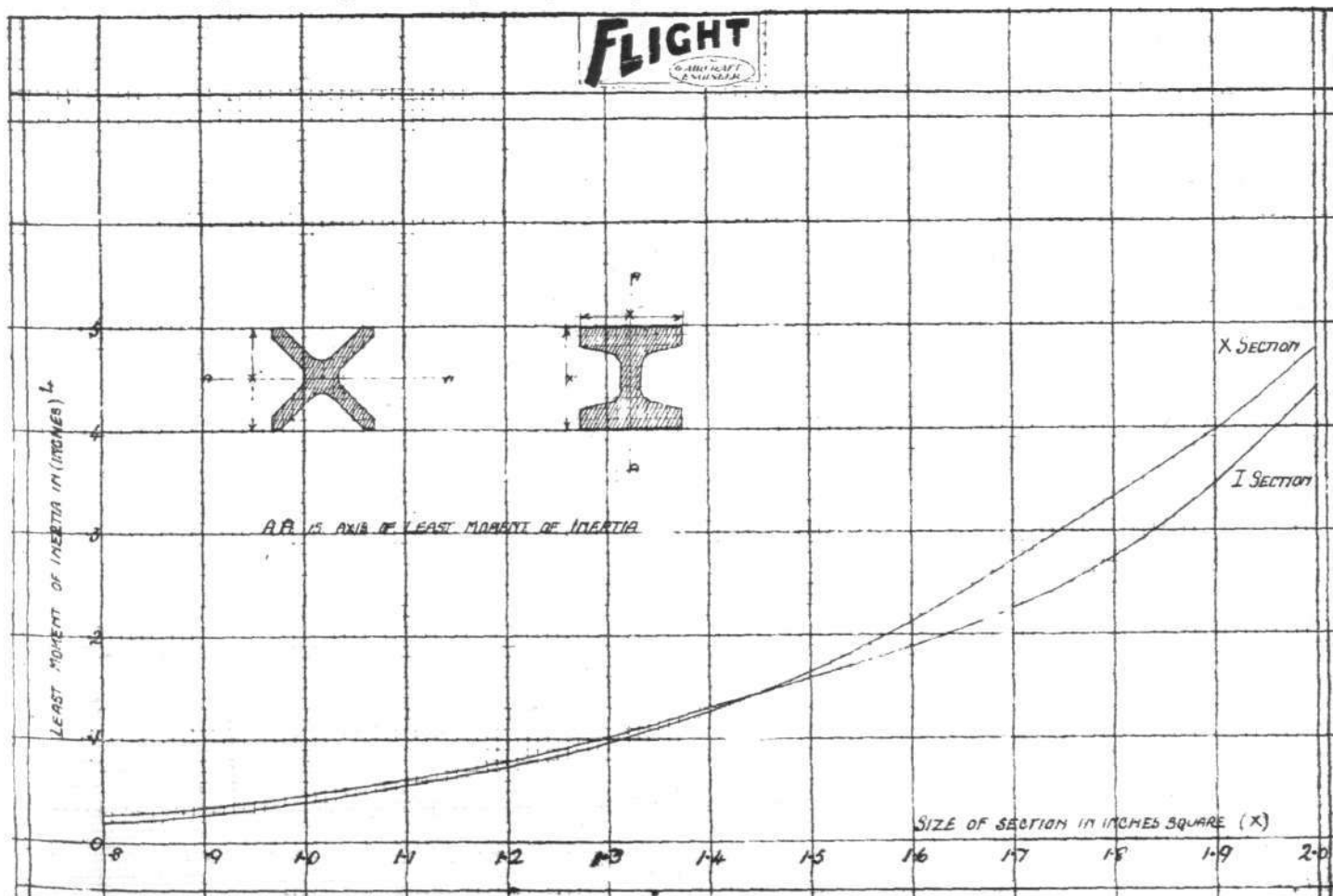


Fig. 24.

number of members which might with advantage be made of X section. The *longerons* probably do not lend themselves so well to this section owing to the fact that they have to be bent, and also from considerations connected with the attachment of the

fabric covering. For the body struts, however, it would appear that the X section is particularly suitable and deserves to be more widely used than is generally the case.

(To be continued.)

QUESTIONS IN PARLIAMENT

British Cellulose Company

Lieut.-Col. MALONE, in the House of Commons on April 14, asked the Prime Minister whether his attention has been drawn to the fact that permission was granted to the British Cellulose and Chemical Manufacturing Co. to issue fresh capital in January last; whether the case of the company was *sub judice* at that date; and whether it would have been preferable to have suspended the issue pending the publication of the Report of Lord Sumner's Committee?

The Chancellor of the Exchequer (Mr. Chamberlain): The answer to the first part of the question is in the affirmative. The matter was carefully considered, and it was not considered advisable to suspend the issue.

Mr. Bottomley: Is it not the fact that the people most pressing for the publication of this Report are the company itself?

Mr. Chamberlain: I have no knowledge of that, Sir.

Machines Destroyed

Mr. RAPER asked the Under-Secretary of State for Air whether a number of aeroplanes which were quite fit for instructional purposes and for practice flying have been destroyed after the engines had been removed, when they could have been put to good use in training cadets and junior flying officers; and whether a number of late types of machines have been destroyed in France after the engines had been removed, when they have merely had their under-carriages crashed, broken one or two spars, or suffered some other easily repairable injury?

The Under-Secretary of State for Air (Maj.-Genl. Seely): The machines that have been reduced to produce, *i.e.*, reduced to their component parts, fall into two classes:—

(a) Those that have been declared "obsolete" by the Air Council; one of the points taken into account by the Council in pronouncing a type "obsolete" is its suitability for instructional or practice flying. The total number of such machines reduced to produce from November 11, 1918, to February 28, 1919, was 2,646.

(b) Those that have been so damaged in flying accidents as to be beyond the capacity of the unit concerned to repair them, and not worth the cost of transport to a repair depot. The only standard machines reduced to produce in France are of this class.

Handley-Page Machines, Hendon

Mr. RAPER asked the Under-Secretary for Air what damage was sustained by the 20 Handley-Page machines which have been left uncovered in the wet at Hendon for periods varying from one month to three months during the recent bad weather, and the value of all parts, both as regards machines and engines, which have been, or will be, replaced as a result thereof before all these machines can be passed as serviceable?

Maj.-Genl. Seely: The total cost of making good the damage sustained by the 32 Handley-Page machines which had to be left in the open at Hendon Aircraft Acceptance Park was £1,672 9s. Of the damage sustained part was due to failure of the dope covering certain of the fabric parts; and the remainder due to the very high winds which injured some of the tail skids, control cables, etc.

Reserve of Aviators

Mr. RAPER asked the Under-Secretary of State to the Air Ministry whether it is the intention of the Air Council to continue the training of cadets and officer pupils who have already received part of their instruction so as to form an Air Force Reserve similar to the Special Reserve of the Army, so that a number of aviators can be called up for training for a set period in each year, thus securing to this country an adequate reserve of aviators prepared for any national emergency?

Maj.-Genl. Seely: There are already more than sufficient trained pilots to meet all the requirements of the Royal Air Force, so far as can be anticipated, and it is not considered necessary to call upon cadets whose training is not completed.

R.A.F. Equipment Officers' Gratuity

Lieut.-Col. SPENDER CLAY asked the Secretary of State for War how the gratuity is calculated for equipment of officers who joined as such prior to the issue in 1916 of H.C. 1 193; and whether these officers are entitled under their contract to the gratuity as laid down in Article 226 of the Pay Warrant?

Maj.-Genl. Seely: Army Council Instruction 193, of 1916, was issued with a view to making clear which officers of the Special Reserve of the Royal Flying Corps were entitled to gratuity under Article 226 of the Army Pay Warrant. At the time this Article was framed the appointment of "equipment officer" did not exist, and the special gratuity of £150 per annum provided under it was designed only for flying officers and not for those engaged on ground duties. Officers appointed as equipment officers accord-

ingly have no contract entitling them to gratuity under Article 226 B, but they are eligible, under Article 497 (b) of the Pay Warrant, for gratuities of 124 days' pay for the first year and 62 days' pay for each further year, or part of a year, of service, based, subject to certain conditions, on the highest rate of pay they have drawn at any time during their service.

Air Routes

Lieut.-Col. MOORE-BRABAZON asked the Under-Secretary of State for the Air Ministry whether it is still the policy of the Government to allow private enterprise at first to operate the easier of the great air routes, the more difficult being operated by the State; and whether such decision has been changed in view of the statements to the effect that the Cairo to India and beyond route is to be operated by the Government?

Maj.-Genl. Seely: The policy of His Majesty's Government is broadly that stated in the first part of the question. Strategic considerations enter largely into the route between Cairo and India, and it would, therefore, be premature to make any precise statement at present.

Aeroplane Manufacture in Germany and Austria

Mr. RAWLINSON, on April 15, asked the Prime Minister what steps, if any, have been taken to prevent the manufacture of aeroplanes in Germany and Austria at the present time?

Mr. Churchill: No steps have been taken in either case to prevent such manufacture under the terms of the Armistice, but export is prohibited.

Miss Violet Douglas Pennant

Mr. THOMAS RICHARDS, on April 16, asked the Prime Minister whether, in view of the fact that the conditions of the pledge given to the House by the Secretary of State for War in the case of Miss Violet Douglas Pennant have now been complied with, the inquiry promised is to take place?

Mr. Churchill: I have been asked to answer this question. I am ready to lay on the Table of the House the correspondence which has passed up to the present on this subject between the Air Ministry and Miss Violet Douglas Pennant if that is the desire of those who are acting for her, and if the House considers it of sufficient importance.

So far as it has at present proceeded, it does not, in my opinion, disclose any case different from that which could be made by any person superseded in any situation against those among whom and under whom she has been working. I have, however, asked for more precise definitions of the various allegations which Miss Violet Douglas Pennant has preferred.

It is possible that some of the statements might be suitable for private persons to test in the Courts in the ordinary way; but I do not at present discern any sufficient public grounds to justify the considerable expense of an official inquiry.

Mr. Richards: Is it not a fact that Miss Pennant made specific charges against certain people?

Mr. Churchill: As I have said I am willing if those who are acting for Miss Pennant wish it, and if they think it is in her interest, to lay the correspondence on the Table of the House so that hon. members can judge for themselves.

Brig.-Genl. Sir O. Thomas: Will the right hon. gentleman supply the House with the report of the hon. member for Luton (Mr. Harmsworth) in respect of which the Prime Minister has already promised an inquiry into this case?

Mr. Churchill: No, Sir, I am not prepared to lay that report on the Table. After making inquiries I ascertained that the hon. member for Luton considered it was a private report drawn up by him for the information of the Prime Minister, and on general grounds it would be fatal to the administration of public Departments if documents of this kind prepared in this way were subsequently to be published.

Mr. Tyson Wilson: If the right hon. gentleman lays on the Table of the House the papers referred to, will he also lay on the Table the letters of protest from Miss Pennant's subordinates?

Mr. Churchill: I think the matter is one between this lady and the Department concerned. The correspondence I have mentioned appears to be relevant to the issue.

Compensation for Air Raid Damage]

Mr. SAMUEL SAMUEL asked the Prime Minister whether he will take steps to compensate British subjects whose property has been destroyed by damage by air raids and bombardment out of the first moneys received from the German war indemnity, who were uninsured, in the same way as French and Belgian citizens are compensated for the material damage to their property, in consequence of the German invasion?

Mr. Bonar Law: I cannot make any statement at present with regard to the disposal of moneys received from the German indemnity.

Holiday Flying

LONDONERS had two opportunities of flying during the Easter Holidays, and both were taken full advantage of in spite of the short notice. At Cricklewood three Handley Page machines, piloted by Col. Douglas, D.F.C., Maj. Tool, M.C., and Capt. Hill, M.C., were kept busy each day taking up parties of passengers for half-hour "flips" at two guineas a time, while at the Stag Lane aerodrome, Edgware, the machines of the L. and P. school, piloted by Mr. M. G. Smiles and Mr. W. G. Warren, jun., were always in demand for flights at one guinea each.

The visitors to the Cricklewood aerodrome also saw some parachute descents by Miss Sylvia Boyden, Mr. Newall, and Signor Bordini, all of them using the Calthrop Guardian Angel parachute. They went up as passengers in one of the Handley Page machines and dropped successfully from a height of 1,200 ft.

Flying trips were also carried out at a number of seaside resorts, and the Avro Co. arranged for flights at Southport and Hamble, the trips from the latter place, over Southampton Water, being very popular, the first pair of passengers being the Mayor and Mayoress of Southampton (Alderman and Mrs. Kimber).

Flying Round the U.K.

LEAVING Andover, Hants., on Saturday morning, two Handley Page machines flew to Edinburgh, and on the following day arrived in Belfast. They left again at midday on Monday for Cornwall *via* Dublin, and one of them returned to Andover on Tuesday. The second was detained at Milton aerodrome, near Pembroke, by a slight mishap. Each machine carried nine passengers. They were in charge of Maj. Smithy, and the pilots were Capt. Stewart and Capt. Snook.



Casualties

Capt. RUPERT NORMAN GOULD ATKINSON, M.C., D.F.C., Croix de Guerre (Belgium), R.A.F., was the elder son of the late Mr. Brenan Atkinson, of Shanghai, China, and of Mrs. Atkinson, of High Kelton, Berkhamsted, Herts. He was born in 1896, and was educated at Orley Farm School, Harrow, and at Marlborough College (Preshute). He went up to Pembroke College, Cambs., in June, 1914. In the following September he joined the 16th (Public Schools) Battn., Midx. Regt., and obtained his commission in the 15th Midx. in December, 1914. On July 28, 1915, he proceeded to Cameroon, where he was attached to the West African Regt. throughout the campaign. He was invalided home in April, 1916, and in August joined the R.F.C., and, obtaining his pilot's certificate, proceeded to the Western front in November, 1916. He was gazetted captain in July, 1917, becoming flight commander shortly afterwards. From November, 1916, till the Armistice, Capt. Atkinson was engaged almost continuously in artillery observation, photography, night-bombing, and low-flying machine-gun work. He received the M.C. in 1917 for a daring and successful attack on enemy observation balloons; the D.F.C. in 1918, and the Belgian Croix de Guerre in 1919, when he was also recommended for a bar to his D.F.C. He returned home on leave from Cologne at the end of February, and died of pneumonia, following influenza, on March 7.

Sec. Lieut. KENNETH BASSANO COOKSEY, Royal West Kent Regt., attached R.F.C., reported missing while on active service in France on Easter Sunday, April 8, 1917, now presumed to have died on or since that date, was the only son of Mr. and Mrs. Thomas Cooksey, Old Hill, Staffs.

Flight Sub-Lieut. EDWARD CUTHBERT STOCKER, R.N., reported missing, and now presumed killed while flying near Dompierre on March 27, 1918, at the age of 18, was the younger son and only surviving child of Maj. E. G. Stocker, R.A.M.C.T., and Mrs. Stocker, Carn Brea, Cornwall.

Capt. J. J. PAINE, late R.A.F., elder son of A. E. Paine, Sheffield, died on April 13 at Chesham Bois, Bucks.

Capt. STANLEY E. RITCHIE, R.A.F., who was killed while flying on April 16 at the age of 23, was the eldest son of Mr. and Mrs. E. Ritchie, Buckhurst, Dorking.

Married

RUSSEL BANTING, R.A.F., was married on April 14, at Christ Church, Lancaster Gate, to SERENA PHYLIS LION, youngest daughter of John Lion, of Severn Lodge, Addison Road.

Lieut. LEONARD DURANT ST. GEORGE, R.A.F., of Wellington, New Zealand, was married on April 17, very quietly in London, to Mrs. JOSEPHINE LABOUCHERE-HILLYER, of 4, Cornwall Mansions, Chelsea, widow of Mr. G. Labouchere-Hillyer.

Capt. A. H. RAYNER, R.F.C., youngest son of Mr. G. G. Rayner, Croydon, was married on April 8, at Whitchurch Parish Church, to MARY JOYCE, R.A.F., only daughter of the Rev. Hugh and Mrs. Wood, of Whitchurch.

To be Married

The engagement is announced between Capt. L. T. BEDDOW, R.A.F., of Thorverton, near Exeter, and DORIS HOLMES

SCOTT, Deputy Administrator, W.R.A.F., widow of Capt. A. Holmes Scott, M.C., R.E., and only daughter of the late J. S. Clayton, V.D., M.D., F.R.C.S. Edin., and Mrs. Clayton, 97, Vicarage Road, Eastbourne.

A marriage has been arranged, and will take place shortly, between WILLIAM ARCHDALE BLAND, C.B., Assistant Financial Secretary, Air Ministry, and WINIFRED, only daughter of the late Thomas Allen BALL and Mrs. Ball, of Rugby.

The engagement is announced between Capt. GILBERT ELIOTT-LOCKHART, R.A.F., youngest son of the late David Elliott-Lockhart, and DORA, only daughter of the late Rev. L. R. WHIGHAM and Mrs. Whigham, of Morden House, Guildford.

The engagement is announced between Lieut. GAVIN HUTCHISON GRIEVE, R.A.F., son of Mr. R. E. Grieve, Guelph, Canada, and SOPHIE CECILIA YORKE, daughter of Mr. and Mrs. Yorke, Langton, Pembrokeshire.

The engagement is announced between Lieut. the Hon. JOHN S. PARKER, East African Protectorate Force and R.A.F., second son of the late Lord Parker of Waddington, and the Lady Parker of Waddington, of Aldworth, Haslemere, Surrey, and MARJORIE, second daughter of Sir James and Lady URQUHART, Magdala House, Dundee.

The engagement is announced between Capt. (acting Maj.) EUGENE COURTENAY PERRIN, O.B.E., 4th Battn. the Cheshire Regt. and R.A.F., elder son of Mr. and Mrs. J. E. Perrin, The Paddock, Hoyle, and KATHARINE ARTHUR MARY VIOLET, widow of Capt. CHARLES GRAZEBROOK, King's Royal Rifle Corps, and daughter of the late Arthur Hickman and of Mrs. Morgans, Little Meadow, Radlett.

The marriage of Capt. M. H. STEPHENS, R.A.F. (late R.N.A.S.), youngest son of Mr. J. Stephens, Toronto, Canada, and MARJORIE, younger daughter of the late Mr. Alexander FINN, H.B.M. Consul-General for Chile, and Mrs. Finn, of 2, Park Road, Richmond, Surrey, will take place very quietly, owing to mourning, at St. Matthias's Church, Richmond Hill, on Saturday, April 26, at 2.15 p.m.

The engagement is announced between Lieut. ERIC S. WHEATLEY, R.A.F., younger son of Col. H. S. Wheatley, C.B., I.A., and Mrs. Wheatley, of The Knoll, Farnham, Surrey, and DOROTHY HODGKINSON, daughter of Dr. and Mrs. Hodgkinson, of Bradshaigh, Farnham, Surrey.

Items.

Mr. WILLIAM MORRIS JONES, M.Sc., B.A., has been appointed lecturer and experimentalist in physics at the University College, Bangor, where he was trained. He has been engaged on important War research work at Cambridge University, and has recently been demobilised from the R.A.F.

Lieut. J. A. POUCHOT, D.C.M., R.A.F., 56th Squadron, who was reported missing on October 5, 1918, and since reported killed, was last seen flying over Cambrai in an S.E. 5A 5708, while doing patrol with nine other officers. Any information concerning his fate will be gratefully received by Mr. K. M. Spikins, C.T.B., Parc du Cinquantenaire, Bruxelles.

Separation allowance.—Men enlisting will be entitled to separation allowance under the existing rates and conditions, these rates and conditions being subject to revision.

For further particulars application should be made to any of the following recruiting depots:—4, Henrietta Street, Covent Garden, W.C.; 8, Tyndall's Park Road, Clifton, Bristol; 12, Newport Road, Cardiff; Carlton Chambers, Paradise Street, Birmingham; 8, George Street, Nottingham; 12, Abercromby Square, Liverpool; The Mount, Springfield Mount, Leeds; 10, Sydenham Terrace, North Road, Newcastle-on-Tyne; 9, Somerset Place, Sauchiehall Street, Glasgow. Men desirous of enlisting should apply to any of the above depots or to the nearest R.A.F. unit.

Recruiting for the R.A.F.

RECRUITING for the R.A.F. begins on Monday next. Recruits are required in all trades, both technical, clerical, and non-technical. Ages 18 to 26.

Periods of enlistment.—Four years Regular service, eight years Reserve; five years Regular service, seven years Reserve; six years Regular service, six years Reserve; eight years Regular service, four years Reserve.

Pay.—Men enlisting will receive the present rates of pay, plus war bonus, until further orders. A revised scale of pay for the R.A.F. is now under consideration, and will shortly be published, and men will then (or at such later date as may be decided) be brought on to the rate of pay of their rank according to that scale, in lieu of present rates plus war bonus.

ELEMENTARY NAVIGATION FOR AIRCRAFT PILOTS

By A. W. BROWN

(Concluded from page 502)

As in 'plane' navigation, the majority of spherical triangles which require solution in practice are not right-angled. For example, assume that a pilot wishes to know the track angle at starting from a place, A, in lat. 10° S., long. 40° W., to place, B, in lat. 25° N., long. 15° W.

The diagram is shown in Fig. 8, in which:—

$$a = (90^{\circ} - 25^{\circ} \text{ N}) = 65^{\circ}, \text{ or co-lat. of place B.}$$

$$b = (90^{\circ} + 10^{\circ} \text{ S}) = 100^{\circ}, \text{ or co-lat. of place A.}$$

$$N = 40^{\circ} \text{ W.} - 15^{\circ} \text{ W.} = 26^{\circ},$$

because the angle between the meridians at the pole is the same as the difference in longitude of the places through which the meridians pass.

As in plane triangles, there are two rules for the solution of spherical triangles, viz.:—

Rule 1.—Sine Law.

$$\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}.$$

(Compare this with the Sine law for plane triangles, Eq. 12.)

Rule 2.—Cosine Law.

$$\cos a = \cos b \times \cos c + \sin b \times \sin c \times \cos A.$$

$$\text{or } \cos A = \frac{\cos a - (\cos b \times \cos c)}{\sin b \times \sin c}.$$

Before A in Fig. 8 can be found, it is necessary to find n from Rule 2, thus:—

$$\cos n = \cos 65^{\circ} \times \cos 100^{\circ} + \sin 65^{\circ} \times \sin 100^{\circ} \times \cos 25^{\circ},$$

but $\cos 100^{\circ} = -\cos 80^{\circ}$, and $\sin 100^{\circ} = \sin 80^{\circ}$,
therefore

$$\begin{aligned} \cos n &= \sin 65^{\circ} \times \sin 80^{\circ} \times \cos 25^{\circ} - \cos 65^{\circ} \times \cos 80^{\circ}, \\ &= .906 \times .985 \times .906 - .423 \times .174 \\ &= .747. \end{aligned}$$

from which

$$n = 40^{\circ} \text{ (nearly) } (41^{\circ} 40').$$

A may now be calculated by applying the Sine Law, Eq. 15, thus:—

$$\begin{aligned} \frac{\sin 40^{\circ}}{\sin 25^{\circ}} &= \frac{\sin 65^{\circ}}{\sin A} \\ \sin A &= \frac{\sin 25^{\circ} \times \sin 65^{\circ}}{\sin 40^{\circ}} \\ &= \frac{.423 \times .906}{.643} = .595 \text{ nearly.} \\ A &= 36^{\circ} 30' \text{ nearly.} \end{aligned}$$

Fig. 9 shows how this triangle may be divided into smaller triangles in which the arcs NB_1 , NB_2 , etc., can be calculated by assuming values for N , for the purpose of plotting the great circle track on the chart. At the same time, the varying courses may be calculated.

It may happen that a great circle track will take the pilot

too near the N. or S. pole, or over areas which it is desirable to avoid. In this case, an alternative, although longer, route must be chosen by the pilot, and it may be a loxodrome (a straight line on a Mercator chart), an arc of a small circle, or a combination of arcs of great circles and either of the preceding curves.

Position Finding

In finding the position of an aircraft by means of observations of the sun or a selected star, the methods employed are essentially the same, differing only in the times at which the sun or star is vertically over the Greenwich meridian. The following deals only with the sun, but is also applicable to the stars.

Finding the Longitude by Direct Observation

When the sun is vertically over the observer's meridian, it is 12 o'clock mean noon for that meridian, and the sun has reached its greatest height above the observer's horizon, the earth rotates through 360° in 24 hours, or 1° in four minutes of time, so that if Greenwich mean time (G.M.T.) is known, the difference in time between Greenwich noon and observer's noon may be found, and converted into degrees of longitude E. or W. of the Greenwich meridian.

Example.—When it is noon for observer, G.M.T. is 3 h. 40 m. p.m. What is observer's longitude?

In this case, observer's noon is 3 h. 40 m. later than Greenwich noon, and he is therefore W. of Greenwich. His longitude is

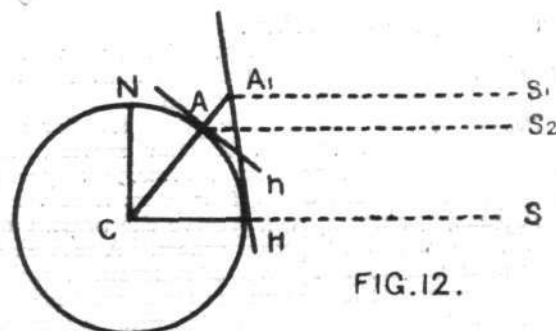
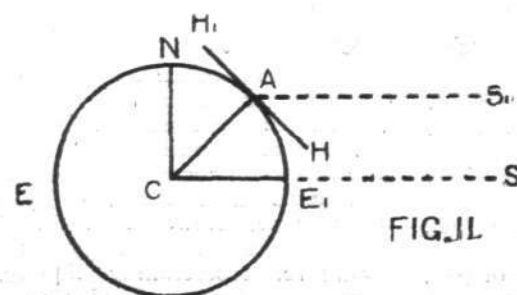
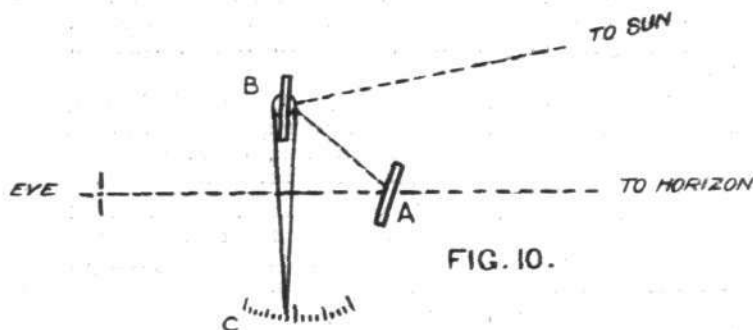
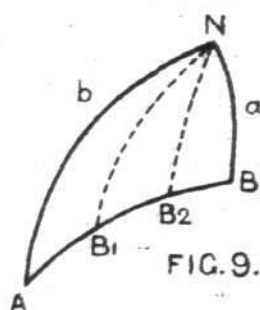
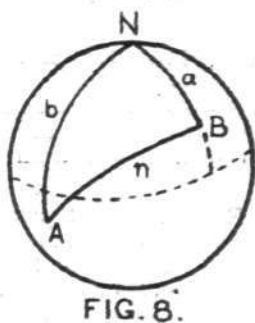
$$\frac{3 \frac{40}{60} \times 60}{4} = 55^{\circ} \text{ W.}$$

Another example.—When it is noon for observer, G.M.T. is 5 h. 30 m. a.m. What is observer's longitude?

In this case, observer's noon is $6\frac{1}{2}$ h. earlier than Greenwich noon, and he is therefore E. of Greenwich. His longitude is

$$\frac{6\frac{1}{2} \times 60}{4} = 97^{\circ} 30' \text{ E.}$$

The height of the sun above the horizon is observed and measured by means of the sextant, illustrated diagrammatically in Fig. 10. It comprises a mirror A, half silvered and half clear, fixed on the framework of the instrument and a mirror, B, fixed on an arm which may be moved over a graduated arc, C. Through an eye-piece, the observer regards the horizon through the clear portion of A, and by means of B the sun is reflected on to the silvered portion of A. The arm is moved until the sun appears to coincide with the horizon, when its altitude in degrees above the horizon may be read on the scale, C, the maximum angle being at noon for the observer's meridian.



There is a chance of error in determining the noon position in this manner, because the sun appears to hold its maximum altitude for two or three minutes of time, but this error may be minimised by taking the mean time of the beginning and end of the apparent maximum.

Finding the Latitude by Direct Observation

At every instant the sun is vertically over some spot on the earth's surface; this is called the sun's zenith position. The latitude of this position varies from $23\frac{1}{2}^{\circ}$ N. at midsummer, to $23\frac{1}{2}^{\circ}$ S. at midwinter, and back again. The longitude, course, depends upon G.M.T. The variation of the latitude of the zenith position is called declination, and its values are tabulated in the *Nautical Almanac* for every day of the year. When the declination is 0° , the sun is vertically over the equator, and the altitude of the sun at observer's noon is then equal to the co-latitude of his position, as will be seen from Fig. 11, in which A is the observer, HH₁ his horizon, and S₁AH the sun's altitude at noon as measured by the sextant. C is the centre of the earth, and NCA = S₁AH, which is the co-latitude of A, the latitude being $(90^{\circ} - \text{co-lat.})$. The distance of the sun is so great that the lines, AS₁ and CE₁S, may be assumed to be parallel.

If, in using the sextant, the lower edge of the sun is brought down to the horizon, approximately $16'$ must be added to the reading of the altitude, as the diameter of the sun is approximately $32'$. A correction is also necessary for refraction, which causes the sun to appear higher than it actually is, and tables of the correction for refraction are contained in the *Nautical Almanac*. When the sun's declination is other than zero, and is on the same side of the equator as the observer, then the sun's altitude will be greater than the co-latitude by the amount of the declination, and the declination should be subtracted from the altitude. Similarly, when observer and declination are on opposite sides of the equator, the observed altitude will be less than the co-latitude by the amount of the declination, which should be added to the altitude in order to obtain the co-latitude.

Effect of Height upon Observed Altitude

When the observer is at a height above sea-level, his horizon is extended, and the altitude of the sun as measured by the sextant will be greater than the true altitude. This is shown in an exaggerated form in Fig. 12, in which S₁AH is the true altitude, and S₁A₁H₁ is the altitude measured when A₁ is the observer at the height AA₁ above sea-level.

The angle by which the observed altitude is to be decreased in order to give the true altitude is an angle whose cosine is given from theoretical reasons as $\frac{CA}{CA_1}$. CA is the earth's radius, and CA₁ is the radius plus the height of the observer, so it may be expressed thus:—

$$\cos. \text{ correction angle} = \frac{\text{Earth's radius in feet}}{\text{Radius plus height.}}$$

The earth's radius may be taken as 3,956 miles, or 20,887,680 ft. For a height of 10,000 ft., this gives a correction angle of $1^{\circ} 47'$, nearly, and although small it must be taken into account, since an error of 1° of latitude means an error of 60 nautical miles in position.

Finding the Position at Times other than Noon

The noon position method only permits of one observation per day, and this is insufficient for the navigation of aircraft or vessels. Means must, therefore, be employed which will enable the position to be found at shorter intervals, and these means are found in the Sumner Circles and the Burdwood Azimuth Tables.

As previously explained, the sun's zenith position may be found from its declination, and G.M.T. With the zenith position as centre, a small circle may be described, and from any point on the circumference of that circle the sun will have the same altitude. Different circles may be described corresponding to different values of the altitude, and these circles of equal altitude are known as the Sumner circles. An observation of the sun's altitude at any time indicates the circle in which the position lies, but does not fix the exact point in the circumference.

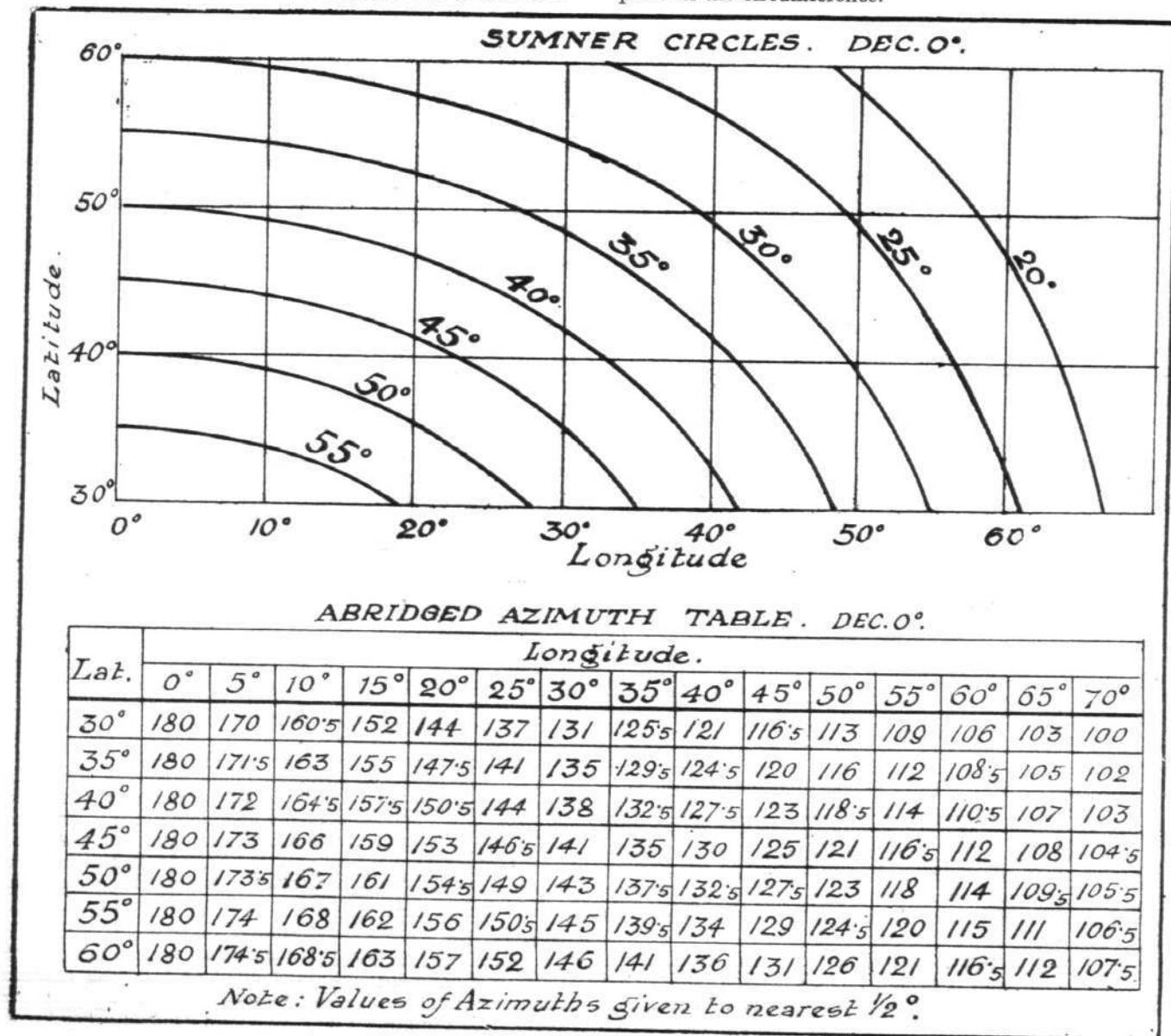


Fig. 13

Sumner circles may be drawn on the surface of a globe by means of a pair of compasses, but if drawn on a plane surface, such as a sheet of squared paper, they must be calculated point by point. For a declination of 0 deg., a series of points on a Sumner circle may be readily calculated by assuming the latitude of each point and calculating the longitude from the zenith position by applying Napier's rule, whence:—

$$\text{Cos. long.} = \frac{\sin. \text{altitude}}{\cos. \text{latitude}}$$

In making these calculations it should be remembered that the latitude and longitude are equal to, or less than (90 deg. — altitude).

Fig. 13 shows a portion of a quadrant of the Sumner circles with 5 deg. intervals for declination 0 deg., between latitudes 30 deg. and 60 deg., drawn on ordinary squared paper, together with an extract of the azimuth values from "Brown's Completed Burdwood."

Having determined from the altitude the Sumner circle in which the position lies, the next step is to find the point in that circle corresponding to the position. This may be done by measuring the azimuth, or true bearing of the sun from N. or S. Thus the azimuth is 180 deg. when the sun is due N. or due S. of the observer, and 90 deg. when it is due E. or W. Each point in the circle corresponding to the observed altitude will have a different azimuth; therefore, an observation of the altitude and azimuth will fix the position relatively to the sun's zenith position, and G.M.T. at the time of observation will enable the position relative to the Greenwich meridian to be ascertained.

As an example, assume that at 10 a.m., G.M.T., the observed altitude is 40 deg., and the azimuth 155 deg., with the sun E. of the aircraft, dec. 0 deg. The latitude will be less than 50 deg., since it cannot exceed (90 deg. — alt.), and it will be N., because the sun is S. of the observer. The position will lie on the Sumner circle for 40 deg. Referring to the Burdwood tables, try lat. 48 deg., finding under dec. 0 deg.

that azimuth 155 deg. corresponds to long. 19 deg. nearly. This point lies *outside* the Sumner circle, so make another trial with lat. 46 deg., when azimuth 155 deg. corresponds to long. 18 deg. nearly, and this lies *inside* the Sumner circle. The required position must lie between these two points, and a third trial with lat. 47 deg. shows that the long. is nearly 19 deg. W. of the sun. Since G.M.T. is 10 a.m., the sun is two hours, or 30 deg., E. of Greenwich; therefore the position of the observer is lat. 47 deg. N., long. 11 deg. E. nearly.

This method involves trial and error, but with a little practice it can be carried out very rapidly. The complete Burdwood tables need not be carried by the pilot, only an extract corresponding to the declination at the date of the journey being necessary, and this may be printed alongside the graph of the Sumner circles as shown in Fig. 13. Observations may be made at any time of the day, and the degree of accuracy obtained is sufficient for the navigation of aircraft. The rapidity in use and the absence of calculation other than the simple addition of angles, render it a convenient method for the use of pilots.

Conclusion

Pilots who are sufficiently interested to wish to go deeper into the theories of navigation, and the accurate methods employed on vessels should refer to text-books on navigation. For the sake of brevity, and to avoid confusing the beginner, the writer has purposely omitted a description of the relation of G.M.T. to apparent time, which at the worst introduces an error of some sixteen minutes in longitude at apparent noon.

The principles described are used for observations of the stars, but the times at which the principal stars cross the Greenwich meridian vary considerably in G.M.T. throughout the year; the rules for calculating these times are to be found in the Nautical Almanac, and will be referred to in further articles on navigation.

The New R.A.F. Clubhouse

THE R.A.F. Club, which is at present housed in temporary premises in Bruton Street, will shortly—probably at the end of May—move into the Lyceum Club, Piccadilly, which has been purchased by the trustees.

A Quintuple Fatality at Andover

WHILE starting off for a practice night flight from the R.A.F. Weyhill Aerodrome, Andover, at 2.30 a.m. on Tuesday, a twin-engined Handley-Page machine apparently failed to clear the roof of a low building. As a result the machine crashed to the ground and caught fire. Two of the occupants, Lieut. E. A. Westall and Sergt. Smith, were thrown out and rescued, but five—Major T. A. Batchelor, Capt. W. R. Adkins, Lieut. A. B. Whiteside, Flight-Sergt. H. H. Heales and Corpl. E. G. Ward—were burnt to death.

Brussels to London by Air

M. RANKIN, Minister of Belgian Railways, Posts, and Telegraphs, on Sunday week came from Brussels to London in a Handley-Page two-engined machine converted for passenger use. The journey, which occupied over four hours, was accomplished in spite of a strong wind and unfavourable conditions.

Air Services in Canada

THE Canadian Pacific Railway Company is applying to Parliament for authority to establish air services between points within or without Canada.

Australia's Air Defences

A SCHEME of aerial defence, which has been drafted by the Commonwealth Government, contemplates the establishment of various aviation schools, with squadrons of aeroplanes and seaplanes, together with an airship section, the personnel of the scheme numbering 1,400. There will be an initial expenditure of £500,000, and an annual expenditure of the same amount.

Aerial Survey of Australia

HAVING crossed Australia from coast to coast, a distance of 3,000 miles, and located a complete chain of aerial landing stations and fuel depots, Lloyd's aerial survey party have reached the Gulf of Carpentaria, states a message from Melbourne. Civil authorities of inland towns and all the pastoral interests have enthusiastically facilitated the work of the party.

Aeroplanes Bomb Indian Rioters

It is reported from Gujranwala (Punjab) via Simla that aeroplanes, which arrived from Lahore, lent effective aid, with bombs and machine-guns, in dispersing the mob which attacked a train and wrecked the railway station.

Long Distance Flights in U.S.

FLYING a DeH 4, with a 12 cylinder 400 h.p. Liberty engine, Capt. E. F. White, accompanied by Mr. H. M. Shaefer, on April 19 covered the 727 miles between Chicago and New York in 6 hours 50 mins. The weather was ideal, and Capt. White flew at an average altitude of 10,000 ft. This is claimed to be the first non-stop flight between Chicago and New York.

The previous day it was announced that on a similar machine Major T. C. Macauley had flown from San Diego, Cal., to Jacksonville, Florida; and then on to Fort Worth, Texas, a distance of 5,500 miles in 44 hours 15 mins. flying time, making frequent stops.

The U.S. Air Service

MAJ.-GENL. C. T. MENOHER has now been appointed Director of the U.S. Air Service, to "exercise, under the direction of the Chief of Staff, full and complete supervision, control and direction over the Bureau of Aircraft Production and the Division of Military Aeronautics in all that pertains to administration, supply, instruction, training and discipline."

U.S. Aviators not to Compete for Prizes

A DEFINITE decision has now been given by Maj.-Gen. C. T. Menoher, the Director of the United States Air Service, that Army pilots will not be allowed to compete for prizes. He says that the Service favours any competition whose object is aerial performances, without remuneration, of an international, State, or civic character, but as a department of war policy it must disapprove any project involving competition of Air Service teams or individuals with private clubs or enterprises for money prizes or trophies.

U.S. Ordering New Post-planes

THE United States Post Office Department are inviting tenders for aeroplanes of a strictly commercial type particularly adapted to carrying mails. Bids will be opened on June 2, and it is expected that deliveries will begin six months later. The new planes are to be put in use on present aerial mail routes as soon as completed. Machines thus replaced will be used in new services between cities not now touched in the present service. Eventually new machines will be used on all routes.

Across the Andes

THE Chilean pilot, Lieut. Cortinez, who crossed the Andes recently from Santiago and landed at Mendoza (Argentina), has re-crossed the range on his return to Santiago, the journey occupying 2 hours. Lieut. Cortinez reached a height of over 20,000 ft.

AIRISMS

FROM THE FOUR Winds.

It is to be hoped that those considerate folk who surreptitiously imported certain canine pets are now satisfied and pleased with *their* share in reinstating the horror of rabies in this country. The accusation that it was R.A.F. pilots who were responsible for this scourge has never been disposed of, and it's about time some publicity in this direction, for or against, should be vouchsafed.

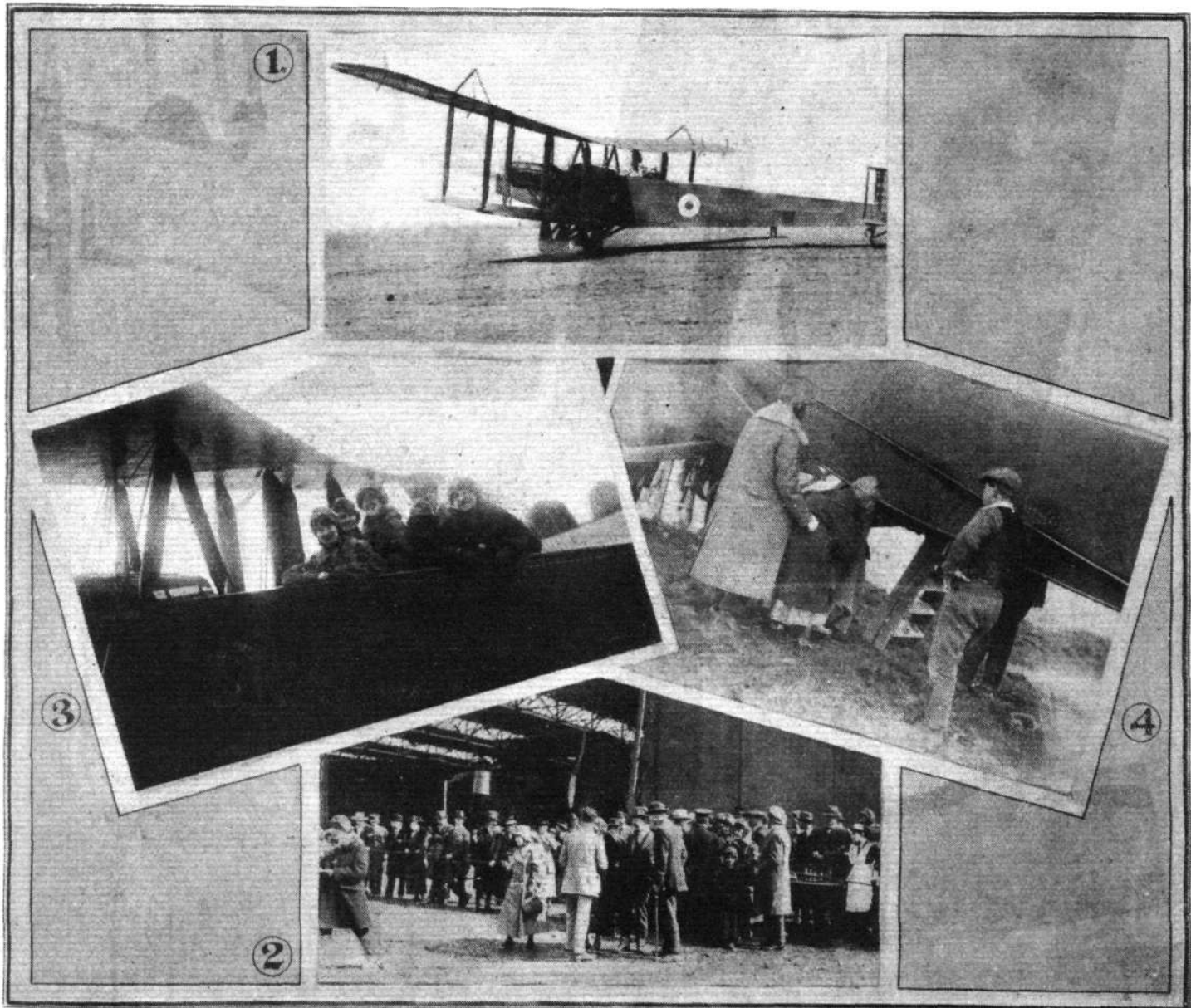
For the first time, we believe, an aeroplane is now recorded as forming part of the design of a memorial window in one of our churches. This historical fact is reported from a church at Brampton, near Huntingdon, and the window is in memory of 45 men of that town who fell in the war. The scene depicted is General Allenby's entry into Jerusalem.

"AEROGRAM" or "airogram" are words suggested by Mr. F. Douet, of Brook Green, as convenient for distinguishing a wireless signal or message to or from an aeroplane or airship, as a variation of radiogram as applied to messages from and to ships. The idea strikes one as distinctly practical.

Looks as if Air Police will actually materialise before the year is much older, as a body is to be trained for New York City at the municipal aviation field, Atlantic City. The police are to be used to guard the flying routes during the aviation meeting of the Pan-American Aeronautical Exposition in May. This will be the first time in the history of aviation for a racing course to be regularly policed by aeroplanes.

HAVING secured the club house of the Lyceum Club, in Piccadilly, for the future home of the R.A.F. Club, besides other premises as "annexes," Lord Cowdray proposes extensive improvements with the object, it is stated, of making the club the finest in London. The best of luck to such good intentions, but under those circumstances it looks as if the scheme is going to cost some.

EVIDENTLY the powers that control the Canadian Pacific Railway are as alive to, and as keen upon, aviation as the many thousands of Canadians who, during the War, helped to make history through the air. The company is applying



CIVILIAN FLYING AT EASTER.—At the Handley Page aerodrome. 1. A "bomber" getting away with passengers clustered in centre of fuselage. 2. Passengers, equipped in flying rig, leaving the booking "office" for their flight. Note small boy, one of the passengers. 3. A group of six passengers in the fuselage, two with pilot in front, making eight passengers per trip. 4. Temporary method of entering, beneath the plane.

to the Canadian Parliament for a charter enabling it to organise an aircraft service throughout the Dominion. The Canadian Pacific Railway will thus be the first railway company in the world to take hold of this new factor in transport, and the first in the field if the charter is granted to establish such a service in Canada.

Of all the cool propositions to emanate even from the Huns, we think the limit has been reached in the claims for indemnity, set forth *per contra* to the demands of the Allies, as declared by the *Frankfurter Zeitung*, to include damages for trouble sustained from air-raids. Ye Gods, and this is put forward as "firstly"!

"COMMANDER DE HAVILLAND flew over the Plaza de Toros at Madrid during a bull-fight and looped the loop," so the report runs. Which is all very well, but what does the handicap for the bull work out at?

How doth desire outrun performance! (I know that is not quoted correctly, but 'twill serve; it was said to fat Jack Falstaff, on the occasion . . . but there's no need to particularise, is there?) We are to have Peace celebrations when there is no peace, and the fountains will run wine (*Tout-à-fait Ordinaire, exigez la marque "Encre rouge!"*), the brave

burgesses will celebrate the occasion in lusty style, while the wise board up their windows and leave their purses at home. And you would think to read the "bitty" papers that flying clubs will soon be springing up like so many gilded mushrooms all over London, where "airplanes can be hired at special fees."

("Thanks, I'll have that Redhead, off the upper shelf!" "Yassir, ninepence fust hour, sixpence every hour after. Boy, take the gentleman's name and five shillings deposit!")

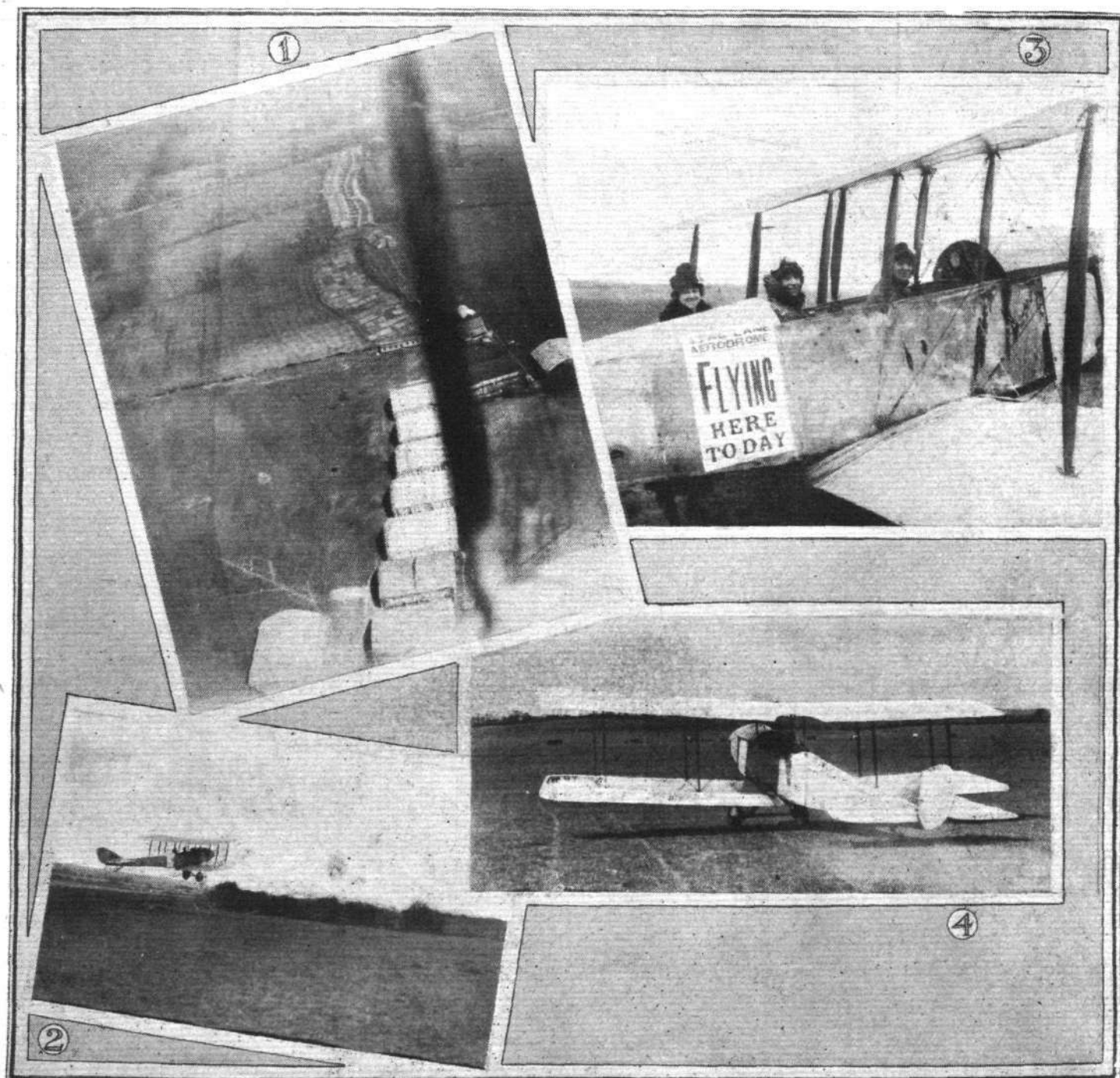
Where was I, when the Muse ran away with me? "Skilled pilots will always be available."

("Now mind, Jeames, no looping, the gentlemen have dined well!")

—and "the club-house is to be in the Georgian period."

(Obvious misprint: they mean "Lloyd-Georgian." Or Græco-Baptist!)

THEN they rattled boxes at us for our coppers, imploring us to contribute to the "War Fund," every errand boy whistled the "Absent-minded Beggar" about his business, and people demonstrated their sturdy patriotism by manhandling those unfortunates who were cast for the part of President Kruger in torch-light processions. That was the time. I well know, when this book, "War Dreams and



CIVILIAN FLYING AT EASTER.—At the London and Provincial Co.'s aerodrome. 1. A snap of the "drome" from the passengers' seat. 2. Getting off for a flight with a lady patron. 3. Two of the many lady passengers, piloted by Mr. Warren, jun., who went "skylarking," and thoroughly enjoyed it. 4. "Taxying" to the starting position.

Their Meanings," was issued. You can tell, because the meanings of "Kopje," "Laager," "Gatling gun," "Mafficking," and the like, appear. It was sold for a penny about the time when helpless babies were being christened "Buller" and "Pretoria."

Now they have brought it up-to-date with "ring-papers," "Zeppelins," "Kiel Canal" and "Conscientious Objector."

It has gained by the new matter. To dream of an "air-pilot," means "a new lodger." There is no mistaking the sex for whom this improving work is intended. Dreaming of a biplane denotes "Your virtue will be assailed, but you will resist successfully." A dentist means that "someone is pulling against you," "volplaning" portends "an improper proposal," and "hemp" may be taken as an index that "You have met your fate, therefore seek no further!" There is a short chapter, thrown in to make good measure for the war-time tuppence, on "How to kiss your young lady," which is not without merit (we should conjecture)!

FROM Copenhagen a local firm is reported as arranging to send pianos across the water by aeroplane. Special planes are to be used, built to carry two pianos. It's to be hoped "the music" will not start, on landing, with a crash.

Lay press comment upon this little stunt is:

"The experiment is an exceedingly interesting one, as it may prove the pioneer of heavy valuable goods traffic."

Next, please.

MR. FRANK ALLEN, of Moss' Empires, Ltd., should obtain bold advertisement if he carries through his idea of using a pilot and two-passenger machine for service upon the Moss tour throughout the United Kingdom, embracing over 30 variety theatres. By this means the "stars" so conveyed will be able, by way of example, to cover Birmingham, Nottingham and Sheffield in one night. Doing several halls per night should become quite interesting if this idea develops to any extent.

ON the only occasion when the chance was offered us of a descent in a parachute, we tried to appear grateful, and said

THE DEATH OF VEDRINES

IT is with the greatest regret that we have to record the death of Jules Vedrines, which occurred on Monday last. He had left Villacoublay at 6.29 a.m., with the intention of flying to Rome on the twin-engined bombing machine with which he had intended to bomb Berlin had not the Armistice intervened. He was seen at Laroche at 7 p.m., and the next news was that his machine had fallen at 10.30 a.m. at Les Fauillouses, near St. Rambert d'Albon, south of Lyons, and about 350 miles from his starting point. It appears that one of the motors stopped, and Vedrines endeavoured to land in a clover field, but by some means the machine crashed among some vines. Both Vedrines and his companion, M. Guillaud, a photographer, were instantly killed, and the machine was badly smashed.

Jules Vedrines, who secured his pilot's certificate No. 312, on a Blériot monoplane on December 7, 1910, first achieved fame by winning the Paris-Madrid event in 1911, and the same year he was fourth in the European Circuit, and second in the Circuit of Britain. In 1912 he won the Gordon-Bennett Cup for France at Chicago, and the next year he flew from Nancy to Vienna, Belgrade, Sofia, Constantinople, Beyrout and Jaffa. As the pages of FLIGHT bear record, these were but the outstanding events of a very active life. When War was declared, he was mobilised, and saw a great deal of active service, but of this little is known. For some time he was engaged on special missions; seven times he dropped spies within the enemy's lines, and three times he descended in enemy territory to pick up spies. Once—at the beginning of last year—he alighted close to a bridge on the Saar, laid a mine, lit the fuse and afterwards flew away again without incident.

It will be recalled that last January he leapt into the lime-light again by successfully landing a Caudron machine on the roof of the Galeries Lafayette, and thereby winning a prize of £1,000 which had been lying dormant during the War.

It had been the intention of Vedrines to start off as soon as possible on a prolonged air tour of the world. His plan was to begin by touring round Africa, to fly from there across Arabia to India, and then down to Australia, across the East Indies. From Australia he meant to go to China, and to reach the American continent over the Behring Straits. He proposed to return to Europe with a landing at

that, on the whole, we preferred poison. But an American veteran, one Ed. Unger, has made over eighty drops at Los Angeles, mostly for the moving picture films, with never an accident. It was he who staged the recent thriller, a combat between a Zeppelin and a battleplane, the picture being taken from another aeroplane. In case the interest might be thought to be flagging a little, the heroine dived gracefully from the Zeppelin into the waters of the bay. The American cinema patron wants value for his "two-bits."

By the way, Unger is now at work on a new form of parachute, which will be big enough to sustain a smashed aeroplane. The spectacle of a disabled craft swinging limply from a Brobdignagian umbrella of this kind would be worth seeing.

And, speaking of the pictures, do you remember those early efforts, streaked as by a torrential rain, which were shown somewhere near the Marble Arch when Wright made his first flight at Issy? How we peered into the screen, watching the incredible craft lift until it soared clear of the ground past all contesting, and the excited rush of the spectators when, after nosing down uncertainly, it finally alighted!

And that reminds us that, to be a moving picture actor in the States, you need to be possessed of more than ordinary attainments. That exuberant "star," Douglas Fairbanks, whose infectious smile and appalling activity have delighted thousands, pilots a seaplane with some distinction. About the time that the villain has the persecuted heroine nicely drugged and tucked away in the back seat of a racing car, and is well headed towards the legendary lugger, you will see the resourceful Douglas hauling his flying boat down the slipway. He leaps into her hull in immaculate flannels, rescues the lady in the nick of time (just before she might have been immolated by the express at the level-crossing), and returns without one smoothly brushed hair out place. It must be nice to realise the dreams of one's boyhood; all of us in our time have tucked our heads down behind Caesar's commentaries on the Gallic war and revelled in visions of doing this kind of thing!

Iceland, and to come back to France after a brief visit to England.



The late M. Vedrines.

THE ROYAL AIR FORCE

London Gazette, April 15.

The following temporary appointments are made:—
Staff Officer, 2nd Class (P.).—Maj. R. C. Lane; Oct. 28, 1918.
Staff Officers, 3rd Class.—Capt. F. F. Loyd; March 8. (P.) Lieut. (actg. Capt.) J. H. Evans, and to retain the actg. rank of Capt. whilst so employed; April 3.

Flying Branch.

Lieut.-Col. (actg. Col.) C. D. Breese, A.F.C., to be Lieut.-Col. (A.), and relinquishes the actg. rank of Col., from (S.O.); April 7.

Maj. (actg. Lieut.-Col.) J. E. Dixon-Spain to be Maj. (A.), and to be actg. Lieut.-Col., without pay and allowances of that rank, whilst employed as Lieut.-Col., from (T.); March 26.

Majs. to be Majs.:—(A.) J. A. G. de Courcy, M.C., from (S.O.); Feb. 6. S. E. Parker, M.B.E., A.F.C., from (S.O.); March 27. (Actg. Lieut.-Col.) A. W. Tedder and relinquishes the actg. rank of Lieut.-Col. on reduction of establishment; April 2.

Capt. R. A. Taylor to be actg. Maj. whilst employed as Maj. (A.); Oct. 2, 1918.

D. Wood (Lieut., Gen. List) is granted a temp. commn. as Sec. Lieut. (A.); Aug. 19, 1918, and to be hon. Lieut. (substituted for notification in *Gazette* of Sept. 17, 1918).

G. W. Mitchell (Sec. Lieut., E. York R., T.F.) is granted a temp. commn. as Sec. Lieut., Obs. Officer; Aug. 16, 1918 (substituted for notification in *Gazette* of Sept. 10, 1918, page 10665).

100086 Flight-Cadet L. G. Lowe is granted a temp. commn. as Sec. Lieut. (A.); Aug. 23, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. H. S. Taylor (Capt., C. Ont. R.); Dec. 7, 1918 (substituted for notification in *Gazette* of Jan. 24, concerning Lieut. H. S. Taylor (Capt., Nova Scotia R.), Lieut. R. E. M. Taunton (Lieut., Manitoba R.); March 12.

[Then follow the names of 216 officers who are transferred to the Unemployed List under various dates. (We regret that owing to the great pressure on our space it is impossible to reprint this portion of the list.—Ed.)]

Capt. O. Greig relinquishes his commn. on account of ill-health, and is permitted to retain his rank; April 16.

The following Capts. relinquish their commns.:—H. M. T. Lehmann (on account of wounds contracted on active service, W. T. Wood (Nova Scotia R.) on account of ill-health; April 16, 1918.

Capt. P. G. Taylor resigns his commn. at own request; March 31.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—W. T. J. Hall, O. A. Moore (contracted on active service), H. J. Walkerdine (contracted on active service); April 16.

The following Lieuts. relinquish their commns. on account of ill-health:—(Hon. Capt.) H. P. Smith (Border R.), R. H. Stacey; April 16.

Sec. Lieut. (Hon. Capt.) L. N. Robinson relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Capt.; April 16.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—E. R. Wallington, C. A. Robotham, W. S. Spark (contracted on active service), W. Susman (caused by wounds), F. W. Savignac (contracted on active service); April 16.

Sec. Lieut. C. McD. de Nobrega is removed from the Service, His Majesty having no further use for his services as an officer; Dec. 16, 1918.

The date of appointment of Lieut. J. B. V. Clements, D.F.C., is May 2, 1918, and not as in *Gazette*, March 7.

Lieut. S. Horscroft, M.C., is as now described and not Sec. Lieut. S. Horscroft, as in *Gazette*, April 8.

The surname of Lieut. W. S. Birkett is as now described, and not as in *Gazette*, April 1.

The notification in *Gazette*, April 11 concerning Lieut. F. W. Marshall is cancelled.

The rank of Sec. Lieut. V. T. Harwood is as now described, and not Lieut., as stated in *Gazette*, March 28.

The rank of Sec. Lieut. H. Hartley is as now described, and not Lieut., as stated in *Gazette*, March 28.

The notification in *Gazette*, Jan. 28, concerning Sec. Lieut. C. B. Gibson, is cancelled.

The notification in *Gazette*, April 1, concerning Sec. Lieut. R. W. Brigstock, is cancelled.

The notification in *Gazette*, March 25, concerning Lieut. F. Fowler, is cancelled.

The Christian names of Sec. Lieut. Daniel Barri Jones are as now described, and not as stated in *Gazette*, Nov. 1, 1918, on page 12903.

The notification in *Gazette*, Feb. 4, concerning Sec. Lieut. F. H. Alder, is cancelled.

The surname of Lieut. A. D. Riches is as now described, and not as stated in *Gazette*, March 14.

The notification in *Gazette*, April 1, concerning Lieut. J. Hirst, A.F.C., is cancelled.

The notification in *Gazette*, March 28, concerning Lieut. (Actg. Capt.) S. W. Highwood, D.F.C., is cancelled.

Administrative Branch.

G. Dyson is granted a temp. commn. as Maj.; March 10.

Lieuts. to be actg. Capts. whilst employed as Capts.:—J. E. B. Cochrane; Nov. 14. (Hon. Capt.) F. F. McKenna; March 4.

Lieuts. (A.) to be Lieuts.:—W. H. Williams; March 18. C. E. Walton, D. Watt; March 19. (Hon. Capt.) L. F. Bettinson, (Hon. Capt.) (actg. Capt.) H. M. Goode, and relinquishes actg. rank of Capt.; March 25.

Lieut. R. R. Herring, M.C., to be Lieut., from (O.); March 18.

Sec. Lieut. (Hon. Lieut.) C. A. Luce to be Lieut.; Aug. 22, 1918.

The following Sec. Lieuts. (late Gen. List, R.F.C. on prob.) are confirmed in their rank as Sec. Lieuts.:—R. M. Cobb; April 1, 1918. H. Wagner; June 22, 1918. W. T. A. Jacob; Oct. 25, 1918.

[Then follow the names of 31 officers who are transferred to the Unemployed List.]

Capt. H. M. Rushworth (Lond. R.) relinquishes his commn. on account of ill-health; April 16.

Lieut. W. Law relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Lieut.; April 12.

Sec. Lieut. F. W. Salmon relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Sec. Lieut.; April 16.

Sec. Lieut. H. W. Gallagher resigns his commn.; March 15.

The surname of Lieut. B. Burton is as now described, and not Barton as stated in *Gazette*, March 14.

The surname of Lieut. W. G. Hurrell, D.F.C., is as now described, and not Harrell as stated in *Gazette*, Feb. 4.

The *Gazette* notice of March 4 concerning Sec. Lieut. J. F. George is cancelled.

Technical Branch.

Lieut. (actg. Maj.) T. L. F. Burnett to be Lieut., and to retain the actg. rank of Maj. whilst employed as Maj., from (S.O.); April 1.

Lieut. (actg. Capt.) H. H. Greig to be Lieut., and relinquishes the actg. rank of Capt. on ceasing to be employed with British Naval Mission; March 14.

Lieut. C. A. Brook to be Lieut., Grade (A.), from (O.); Nov. 7, 1918.

Lieut. T. Foster to be Lieut., Grade (B.), from (O.); March 24.

Lieuts. to be Lieuts., Grade (B.), from (Ad.):—S. H. Pickles, J. D. Davidson, A. L. Stirr; March 24.

Sec. Lieut. G. Moon to be Lieut., without pay and allowances of that rank; April 2, 1918.

Sec. Lieuts. to be Sec. Lieuts., Grade (B.), from (Ad.):—G. W. Webb; Dec. 20, 1918. F. W. Pridham; March 24.

Sec. Lieut. W. J. Lee-Bird (Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut., Grade (B.); Jan. 14.

[Then follow the names of 30 officers who are transferred to the Unemployed List under various dates.]

Capt. A. D. Wigram relinquishes his commn. on account of ill-health, and is permitted to retain his rank; April 16.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. Southall (contracted on active service), C. W. Ware; April 16.

Sec. Lieut. T. L. Bowen is dismissed the Service by sentence of a General Court-Martial; Dec. 16, 1918.

Sec. Lieut. E. L. Hoffman relinquishes his commn. on account of ill-health and is permitted to retain his rank; April 16.

The surname of Lieut. J. Elgood is as now described, and not as J. E. Good as stated in *Gazette*, March 7.

Motor-boat Branch.—Capt. A. H. Mackenzie is transfd. to unemployed list; March 27.

Medical Branch.—H. Gardiner-Hill, M.B.E. (T. Capt., R.A.M.C.), is granted a temp. commn. as Capt.; Oct. 1, 1918, sen. from April 1, 1918. The following are transfd. to unemployed list:—Capt. B. Maclean; March 8. Lieut. Col. G. N. Biggs, M.B.; March 13.

Dental Branch.—The following are transfd. to unemployed list:—Sec. Lieut. D. Campbell; March 28. Capt. C. J. Crocker; March 29.

Chaplains Branch.—Capt. the Rev. N. L. Bicknell, M.A., is transfd. to unemployed list; Feb. 24.

Memoranda.

Lieut. W. C. Alexander to be Hon. Capt.; June 2, 1918.

The following relinquish their commns. on ceasing to be employed:—Maj. J. L. Baird, C.M.G., D.S.O., M.P. (Scot. Yeo., T.F.), and is permitted to retain his rank; Jan. 14. Lieut. G. H. Wadsworth; March 16. Lieut. J. A. Whyte; March 31.

[Then follow the names of nine officers who are transferred to the unemployed list under various dates.]

Capt. H. O'N. De H. Segrave (Lieut., R. War. R.) relinquishes his commn. on account of ill-health; April 16.

Lieut. (Hon. Capt.) G. McD. Turner relinquishes his commn. on account of ill-health (S.O.); April 16.

The *Gazette* notice of March 28 concerning Capt. A. W. Dods is cancelled.

London Gazette, April 18

The following temporary appointment is made at the Air Ministry:—
Deputy Chief of the Air Staff.—Col. (actg. Brig.-Genl.) R. M. Groves, C.B., D.S.O., A.F.C., and to retain the actg. rank of Brig.-Genl. while so employed; March 12.

The following temporary appointments are made, graded for pay at Air Ministry rates:—

Brigadier-General, Air Staff.—Col. (actg. Brig.-Genl.) J. M. Steel, C.B.E., and to retain the actg. rank of Brig.-Genl. while so employed; March 12.

Staff Officer, 2nd Class (T.).—Capt. (actg. Maj.) P. G. N. Ommanney, and to retain the actg. rank of Maj. while so employed; Jan. 3. Capt. (actg. Maj.) R. S. Booth, and to retain the actg. rank of Maj. while so employed; March 20. Capt. V. A. Watson; March 20.

The following temporary appointment is made:—

Brigadier-General.—Col. (actg. Brig.-Genl.) O. Swann, C.B., and to retain the actg. rank of Brig.-Genl. while so employed; April 2.

Staff Officer, 1st Class (T.).—Maj. (actg. Lieut.-Col.) R. Hall, M.B.E.; Sept. 13, 1918.

Staff Officers, 3rd Class (P.).—Capt. H. H. Clarke; March 26. (T.) (Air.) Lieut. (actg. Capt.) S. J. Stocks, and to retain the actg. rank of Capt. whilst so employed; Nov. 14, 1918.

Air Attaché.—Lieut.-Col. C. H. Meares; Dec. 1, 1918.

Flying Branch

Capt. W. E. Molesworth, M.C., to be actg. Maj. whilst employed as Maj. (A.); Sept. 3, 1918.

Capt. (actg. Maj.) S. E. Adams to be Capt. (A.), and relinquishes the actg. rank of Maj. on reduction of establishment; March 25.

Capt. J. H. Woolner, A.F.C., to be graded for purposes of pay and allowances of Capt. whilst employed as Capt. (A. and S.); April 1, 1918.

Lieut. (actg. Capt.) R. C. Kean to retain the actg. rank of Capt. whilst employed as Capt. (A.) from (T.); Dec. 19, 1918.

Lieut. J. W. Young to be actg. Capt. while employed as Capt. (A. and S.); Aug. 25, 1918.

Lieuts. (actg. Capt.) relinquish the actg. rank of Capt. on ceasing to be employed as Capts. (A.):—(Hon. Capt.) H. S. Quigley, M.C.; March 24. N. G. Fraser, A.F.C.; April 11.

Lieuts. (actg. Capts.) to be Lieuts. (A.) and relinquish the actg. rank of Capt. on reduction of establishment:—A. L. Cuffe, A. K. Cowper, M.C., A. H. Curtis, R. J. Housden, J. B. Henry, E. S. Meek, N. L. Robertson, E. R. L. Spraul, N. R. Smuts, R. A. Way, P. Wilson, M.C., G. T. Williams; March 25. C. W. Busk, M.C., P. H. Cummings, D.F.C., W. R. Cox, M.C., H. Haycock, M.C., J. S. Harvey, L. H. P. McEwen, H. N. C. Robinson, H. C. Senior, D.F.C., F. H. St. C. Sargent, D.F.C., C. J. Thompson, A.F.C.; March 27. R. E. Dodds, D.F.C.; March 29.

Sec. Lieut. H. Bardsley to be Lieut.; Nov. 4, 1918.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. C. C. Walmsley (Lieut., Essex R.); Aug. 28, 1918. Maj. B. F. Vernon-Harcourt (Maj., Welsh R.); April 7.

[Then follow the names of 197 officers who are transfd. to the Unemployed List, under various dates.]

Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—H. B. Davis; March 30 (substituted for notification in *Gazette* of Dec. 17, 1918). L. S. Brander; April 6 (substituted for notification in *Gazette* of Jan. 24). G. A. Barry (caused by wounds);

J. J. Lancetot (contracted on active service); W. J. Saunders (caused by wounds); T. C. Wilson (caused by wounds); W. T. Warren (contracted on active service); April 19.

Lieuts. relinquish their commns. on account of wounds:—J. M. R. Miller (K.O.S.B.), P. D. McIntosh (Quebec R.); April 19.

Lieuts. relinquish their commns. on account of ill-health:—W. B. Swart; April 16 (substituted for notification in *Gazette* Oct. 22, 1918). H. W. White (R.G.A.); April 19.

Lieut. F. G. Ibbett is removed the Service for absence without leave; Nov. 7, 1918.

Sec. Lieut. (actg. Capt.) H. G. Clappison relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Capt.; April 15. Sec. Lieut. L. S. Potter relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; April 19. Sec. Lieut. R. C. Hockey relinquishes his commn. on account of ill-health; April 19. Sec. Lieut. G. T. Porter is antedated in his appointment as Sec. Lieut. (A.); Aug. 7, 1918. The Christian names of Sec. Lieut. Edward Gordon Warren are as now described, and not Gordon Edward, as stated in the *Gazette* of Aug. 20, 1918, page 9,704. The surname of Sec. Lieut. W. Coole is as now described, and not Gougle, as stated in the *Gazette* of Dec. 10, 1918, on page 14,573. The initials of Lieut. H. C. Murray are as now described, and not H. C. C. Murray, as stated in the *Gazette* of March 18. The initials of Lieut. W. H. Naylor are as now described, and not W. W., as stated in the *Gazette* of March 7. The initials of Lieut. G. R. Hurst are as now described, and not C. R., as stated in *Gazette* of April 1. The notification in the *Gazette* of March 18 concerning Lieut. A. Jackson is cancelled. The notification in the *Gazette* of March 21 concerning Lieut. P. G. Ashford is cancelled. The Christian names of Lieut. Archibald Elsdon Smith, D.F.C., are as now described and not A. E., as in *Gazette* of Jan. 14. The Christian names of Lieut. Austin Edward Smith, D.F.C., are as now described, and not A. E., as in *Gazette* of March 28. The notification in the *Gazette* of March 28 concerning Lieut. H. J. Jewell is cancelled (*London Gazette* notice of March 11 to remain). The notifications in the *Gazette* of March 28 concerning Sec. Lieut. S. W. Jackson are cancelled. The notification in the *Gazette* of March 7 concerning Lieut. J. S. Hopper is cancelled.

The notification in the *Gazette* of Jan. 17 concerning Lieut. R. B. Beevor is cancelled.

The initials and surname of Sec. Lieut. W. J. Goodey are as now described, and not W. T. Goodney, as stated in the *Gazette* of Dec. 10, 1918, page 14,574.

Administrative Branch

Capt. W. T. F. Holland, A.F.C., to be Capt., and to relinquish the actg. rank of Maj. on ceasing to be employed as Maj., from (A.); March 5.

Lieut. J. F. Battersby to be Hon. Capt.; Dec. 14, 1918.

Lieut. F. Paterson to be actg. Capt. whilst employed as Capt.; Nov. 22, 1918.

Sec. Lieuts. to be actg. Capt. whilst employed as Capt.:—(Actg. Lieut.) A. E. Boyce; Oct. 24, 1918. (Actg. Lieut.) E. Bentley; Nov. 1, 1918. G. L. Grey, from (A.); March 28.

Lieuts. relinquish the actg. rank of Capt. on reduction of establishment:—E. S. B. Tavener; March 25. G. A. Hutchinson; March 27.

Lieuts. (actg. Capt. A.) to be Lieuts., and relinquish the rank of Capt. on ceasing to be employed as Capt.:—H. R. Eycott-Martin, M.C.; Jan. 17. W. E. Green, D.F.C.; Feb. 12.

Lieuts. (A.) to be Lieuts.:—C. H. Williams; Jan. 7. C. Wilderspin; Jan. 18. H. E. R. Twamley; Jan. 20. C. H. Denny, R. F. Overbury; Feb. 10. J. Burness; Feb. 27. T. Elder-Hearn; March 5. F. E. Vipond; March 28. R. A. W. Powell, S. Yates, J. A. Pugh; March 31. A. Baird, I. V. Hunt, L. P. Wallis; April 1. A. Leslie-Moore, W. Wallace, M.C.; April 7.

Capt. F. C. F. Walwyn to be Lieut., from (O.); March 27.

Lieut. W. Gaunt to be Lieut., from (O.); March 29.

The following are granted temp. commns. as Lieuts.:—H. H. Marks, M.C. (Lieut., Durh. L.I.); April 21, 1918, seniority from April 1, 1918. G. G. Raphael (Lieut., Lond. R.); May 17, 1918, seniority from April 1, 1918.

Sec. Lieut. (actg. Lieut.) J. W. Hustwaite to retain the actg. rank of Lieut. while employed as Lieut., from (S.O.); April 1.

Sec. Lieuts. to be Sec. Lieuts. (from A.):—K. Wiggins; March 6. D. A. MacDonald and to be Hon. Lieut. C. F. Purday, M. J. Moffat; March 27. H. T. Hemsall; March 28. W. Badger; March 31. R. W. Davis; April 1. G. Jacob; April 2.

Sec. Lieut. J. C. Tyler to be Sec. Lieut., from (A. and S.); Jan. 2.

Sec. Lieuts. to be Sec. Lieuts., from (O.):—L. F. H. Bird; Nov. 27, 1918.

A. J. Baxter; Dec. 19, 1918. G. A. McGillivray; Jan. 27. H. T. G. Robey;

Jan. 29. J. M. S. MacPherson; Feb. 6. C. J. M. Turner; Feb. 10. P. D. Broughton; Feb. 27. A. O. Fraser; March 6. W. Tunstall; March 19.

Sec. Lieuts. to be Sec. Lieuts., from (T.):—R. Bushell; Jan. 14. J. H. Woodgett; March 31.

Lieut. (actg. Capt.) Lord H. Cecil relinquishes his commn. on being elected M.P.; Dec. 28, 1918.

The following relinquish their commns. on ceasing to be employed:—

Lieut. H. J. Priestland (Temp. Lieut., Loyal N. Lancs. R.); Aug. 9, 1918. Capt. H. C. Lloyd, M.C. (Temp. Capt.), K.R.R. R.; Feb. 5. Lieut. C. Patrick (Lieut., 16th Lancers); March 20. Lieut. (Hon. Maj.) J. Cemlyn-Jones (Maj., R.W. Fus., T.F.); March 27. Lieut. (Hon. Capt.) D. E. Mozley, M.C. (Capt., Glouc. R.); April 2.

(Then follow the names of 28 officers who have been transfd. to the Unemployed List, under various dates.)

Capt. P. Le G. Gribble relinquishes his commn. on account of ill-health, and is permitted to retain his rank; April 19.

Capt. W. E. Birch (S. Lancs. R., T.F.) relinquishes his commn. on account of ill-health contracted on active service; April 19.

Sec. Lieut. C. Wallace resigns his commn., and is permitted to retain his rank; April 19.

The *Gazette* notice concerning Sec. Lieut. N. V. W. Lucas in *Gazette*, April 1, is cancelled.

Technical Branch

Lieut. W. S. Harms to be actg. Capt. while employed as Capt., Grade (A.) (substituted for notification concerning this officer in *Gazette* Jan. 28). Lieut. A. Dent to be Lieut., Grade (A.), from (A.); May 27, 1918. Lieut. A. L. C. Hartland-Rowe to be Lieut., Grade (A.); March 18. Lieuts. to be Lieuts., Grade (B.), from (Ad.):—N. H. de V. Heathcote; Nov. 2, 1918 (substituted for notification which appeared in *Gazette*, Nov. 22, 1918. O. Clayton; Dec. 30, 1918 (substituted for notification which appeared in *Gazette*, Jan. 21). Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) D. McK. Finlayson to be Lieut.; April 2, 1918. Sec. Lieut. (Hon. Lieut.) G. T. Cain to be actg. Lieut. whilst employed as Lieut., Grade (B.); Oct. 14, 1918. Sec. Lieut. A. W. Whistler to be Sec. Lieut., Grade (A.), from (Ad.); Dec. 1, 1918 (substituted for the notification in *Gazette*, Feb. 4). Sec. Lieut. (actg. Lieut.) R. N. Tweedy to be Sec. Lieut., from (Ad.); Sept. 2, 1918, and to retain the actg. rank of Lieut. whilst employed as Lieut. (substituted for the notification in *Gazette*, Oct. 29, 1918). To be Sec. Lieuts., Grade "A," relinquishing the actg. rank of Lieut. on reduction of establishment:—H. Weakley, W. F. Arnold; March 25. M. F. Tomkins; March 27.

Sec. Lieut. C. B. Brown to be Sec. Lieut., Grade "B," from (Ad.); March 27.

(Then follow the names of 36 officers who have been transfd. to Unemployed List under various dates.)

Capt. H. Phillips relinquishes his commn. on account of ill-health; April 19.

Lieut. G. Shanks resigns his commn. at own request; April 19 (substituted for notice in *Gazette*, April 4).

Sec. Lieut. R. A. G. Shepherd relinquishes his commn. on account of ill-health, and is permitted to retain his rank; April 19.

The Christian names of Lieut. James Partington White are as now described, and not as stated in *Gazette* March 21.

The Christian names of Lieut. John Percival White are as now described, and not as stated in *Gazette* March 28.

The notification concerning Lieut. (actg. Capt.) F. M. Howard is as now described, and not Lieut., as in *Gazette* March 18.

The rank of Capt. A. R. Jackson is as now described, and not Lieut. (actg. Capt.) as stated in *Gazette* March 18.

The notification concerning Capt. A. Kennedy, which appeared in *Gazette* April 4 is cancelled.

The notification concerning Sec. Lieut. H. T. Savage, which appeared in *Gazette* March 21 is cancelled, *Gazette* notice March 28 to remain.

Medical Branch

Lieut.-Col. E. C. Cridland relinquishes his commn. on ceasing to be employed; March 7.

Sec. Lieut. (actg. Capt.) L. W. Jones is transfd. to the Unemployed List; March 8.

The notification concerning Maj. L. L. Greig (Staff Surg., R.N.), which appeared in *Gazette* Nov. 26, 1918, is cancelled.

Chaplains' Branch

Assistant Principal Chaplain for Presbyterians.—Rev. W. P. Young, D.C.M. (Chaplain, 4th Class, A.C.D.), is granted a temp. commn. as Chaplain, with the relative rank of Capt., and is granted the relative rank of Maj. whilst employed as Asst. Prin. Chaplain; April 8.

Memoranda

F. J. Toulmin is granted a temp. hon. commn. whilst specially employed with the A.I.D.; April 18.

The following relinquish their commns. on ceasing to be employed:—Temp. Hon. Lieut. M. Tombs; Dec. 16, 1918. Maj.-Gen. G. C. Cayley, C.B.; April 4.

The following are transfd. to the Unemployed List:—Capt. D. R. Parry-Jones, S.O.; Feb. 20. Capt. W. A. Johnson, S.O.; Feb. 28. Maj. G. V. Carey, S.O.; April 1. Capt. F. C. Townshend (Rifle Brig.), S.O.; April 3. Sec. Lieut. (actg. Capt.) H. Sorrell, S.O.; April 4. Sec. Lieut. V. L. Cockle; April 19.

Gazette notice, April 1, concerning Maj. E. A. Falconer is cancelled.



SIDE-WINDS

WITH a laudable desire to anticipate their clients' requirements, Muir Beddall and Co., Ltd., of 4, Bucklersbury, E.C. 4, and Manchester, decided that if they were to be of real service in connection with aviation insurance, they must be prepared to give specialised and expert advice. A new department has, therefore, been opened, and all matters pertaining to aircraft are now handled by an effective pilot and ex-R.A.F. officer, and the wisdom of their decision is shown by the amount of aviation insurance now passing through their hands.

THE Thames Aviation Works, Ltd., announce that their head offices have been transferred from London Fields Station, G.E.R., which is being re-opened for passenger traffic, to their new factory at 30A, Highgate Road, N.W. 5.

A REMARKABLE testimony to the excellence of Messrs. C. A. Vandervell's products and the demand by the public for their fitment, is the news that C.A.V. lighting and starting-sets are now standardised on the following famous all-British Cars:—Austin, Arrol-Johnston, Daimler, Humber, Sunbeam, Vauxhall, Wolseley, besides several others.

It is of interest to note that the chosen lubricating oil of all the British entrants in the Transatlantic flight is Wakefield's Castrol "R."

ONE definite use of the aeroplane for commercial purposes is that of the Bristol Fighter, piloted by Capt. A. M. West, R.A.F. which is engaged on delivering Harma films to various provincial towns including Manchester, Lincoln, Newcastle, Leeds, Birmingham and Glasgow. It is also being used to distribute leaflets advertising the films. The usual load is 6,000 feet of film and 30,000 leaflets.

EVIDENTLY one of the printers was anxious to prove that one from ten leaves nothing, but he might have refrained from using the advertisement of Mr. E. C. Gordon England in our issue of April 10 for the purpose. Fortunately, of course, readers of *FLIGHT* are well aware that Mr. Gordon England is numbered among the pioneers, and that his practical experience in all branches of flying extends over ten years. Incidentally, the number of letters* to hand pointing out this little discrepancy have shown once more how closely the pages of *FLIGHT* are read.

RESETTLEMENT

Resettlement of R.A.F. Personnel

THERE are many officers and men of the R.A.F. who are demobilised or are about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, *FLIGHT*, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

I. N. E. and J. T. (Courses).—You will be best advised to take up a course of aeronautical engineering. By the time you have completed such a course, there should be many openings in commercial aviation. Your Service experience, valuable as it is now, will be infinitely more valuable when you have qualified as an aeronautical engineer.

In the London district, aeronautical engineering courses are being given at:—

1. The Imperial College of Science and Technology, South Kensington, S.W. 7. For fees and further particulars, apply to the Registrar.

2. The East London College, Mile End Road, E. 1. Fees, £10 10s. a session of three terms.

3. The Northampton Polytechnic Institute, St. John Street, Clerkenwell, E.C. 1. Fees, day courses, £11 and £15 a session; evening courses (for members), 10s. a session; for non-members, 15s. a session.

W. B., EX-FLIGHT CADET.—Write to the General Manager, state exactly what you require, and give full particulars of appropriate training and experience (pre-War and Service). See Messrs. Handley Page's advertisement, page 8, *FLIGHT* April 17, 1919. For a test pilot considerable mechanical and scientific experience is necessary in addition to piloting. As you have not outlined your qualifications, we cannot advise you on this point.

A Reader, EX-FLIGHT CADET.—See *FLIGHT*, April 10, 1919, at foot of page 475.

W. S. C. (Engines).—You will be best advised to remain in your present post until commercial aviation develops. See replies to R. E. S., Chief Mechanic (Engines), in *FLIGHT*, April, 3, 1919, and J. P., Ex-Sergeant Rigger, in *FLIGHT*, April 10, 1919.

T. A. B.—We regret we cannot undertake to put you in touch with your previous commanding officers. In any case, it is extremely unlikely that they could assist you in finding employment. If you are a skilled mechanic you should have no difficulty in finding employment, particularly in the motor trade.

COMPANY MATTERS

Vickers, Ltd.

THE directors of Vickers, Ltd., regret that it is not yet possible to submit any balance-sheet to shareholders for the year 1918. The results of the year's work are, however, such as to enable them to recommend a final dividend on the old ordinary shares of 1s. 6d. per share, equal to 7½ per cent., free of income-tax up to 5s. in the £, making with the 1s. per share, or 5 per cent., paid in August last a total of 2s. 6d. per share, or 12½ per cent. According to the conditions of the issue of the new ordinary shares, allotted at the end of 1918, the holders of these shares are entitled (provided that the payments on them were made on the due dates) to a final dividend at one-half the above rate, namely, 9d. per share, or 3¾ per cent., also free of income-tax up to 5s. in the £. Dividends will be posted to shareholders on May 9.

NEW COMPANIES REGISTERED

AFFILIATED AERO CLUBS OF THE BRITISH EMPIRE, LTD.—Capital £100, in £1 shares. To acquire sites for the construction of club houses and landing grounds for the use of aviators and others, and to carry on the business of club and aerodrome proprietors, merchants, agents, engineers, carriers, etc. The subscribers (each with one share) are: G. A. Wingfield, 74, Cheapside, E.C., solicitor; H. Wingfield, 67, Watling Street, E.C., C.A. The following companies have been registered for purposes of acquiring from Aero Stations, Ltd., sites adjoining the places named in the titles. The other objects and general particulars are similar to those of Affiliated Aero Clubs of the British Empire, Ltd.:—Aberdeen Aero Club, Ltd., Birmingham Aero Club, Ltd., Bristol Aero Club, Ltd., Carlisle Aero Club, Ltd., Derby Aero Club, Ltd., Dundee Aero Club, Ltd., Edinburgh Aero Club, Ltd., Exeter Aero Club, Ltd., Folkestone Aero Club, Ltd., Glasgow Aero Club, Ltd., Grimsby Aero Club,

Ltd., Inverness Aero Club, Ltd., Ipswich Aero Club, Ltd., Leeds Aero Club, Ltd., Liverpool Aero Club, Ltd., Manchester Aero Club, Ltd., Newcastle Aero Club, Ltd., Norwich Aero Club, Ltd., Plymouth Aero Club, Ltd.

Aerial Insurance

Now that the question of insurance of machines, passengers, pilots, goods, etc., is so very much to the fore, we shall be pleased to receive enquiries from companies or individuals interested in the subject, with a view to arranging rates, etc., under Lloyd's policies. Enquiries should be addressed to F. King, Manager, Aerial Insurance Department, 36, Great Queen Street, Kingsway, W.C. 2, who is in a position to quote the lowest market rates.

Aeronautical Specifications Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications are printed and abridged, etc.

Published April 24, 1919.

- 580. W. C. McCARTNEY and R. REDPATH. Means for calculating range and height of aircraft. (124,466.)
- 1,108. R. ESNAULT-PELTERIE. Sights for bomb-dropping from aircraft (124,479.)
- 1,118. VICKERS, LTD., and T. K. NORTH. Bombs. (124,480.)
- 1,122. VICKERS, LTD., and R. K. PEARSON. Control members of aircraft. (124,482.)
- 1,324. VICKERS, LTD., G. H. CHALLENGER and H. A. SAVAGE. Aircraft. (124,486.)
- 1,764. SOC. ANON. ITAL., G. ANSALDO and CO. Sighting apparatus for anti-aircraft ordnance. (124,496.)
- 1,827. C. L. V. LEE and B. BINYON. Wireless installations on aircraft. (124,498.)
- 2,199. VICKERS, LTD., and G. H. CHALLENGER. Mounting of guns on aircraft. (124,501.)
- 2,518. M. F. SUETER and T. M. RITCHIE. Airship, etc., envelopes. (124,508.)
- 2,531. VICKERS, LTD., G. H. CHALLENGER and H. A. SAVAGE. Aircraft. (124,509.)
- 2,879. BRITISH EMBALLITE CO. and J. N. GOLDSMITH. Dopes. (124,515.)
- 3,107. F. SAGE and CO. and N. A. T. N. FEARY. Hydro-aeroplane floats. (124,517.)
- 3,139. A. S. E. ACKERMANN. Doors, etc., of aircraft hangars. (124,518.)
- 3,217. R. T. GLAZEBROOK, W. M. ROUSE and A. JOHNSTON. Balloon and airship fabrics. (124,520.)
- 3,304. G. A. SHEPPARD. Inclinometers. (124,522.)
- 3,362. C. W. T. MILLER and J. HURST. Gun mountings for aeroplanes (124,524.)

Index and Title Page for Vol. X.

The 8-page Index for Vol. X of "*FLIGHT*" (January to December, 1918) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 8d. per copy, post free.

If you require anything pertaining to aviation, study "*FLIGHT'S*" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages li, lii, liii, and liv).

NOTICE TO ADVERTISERS

IN order that "*FLIGHT*" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "*FLIGHT*," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

and The Aircraft Engineer,

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.

Telephone: Gerrard 1828.

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Should any difficulty be experienced in procuring "*FLIGHT*" from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.